THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 36 OCTOBER, 1934 No. 1

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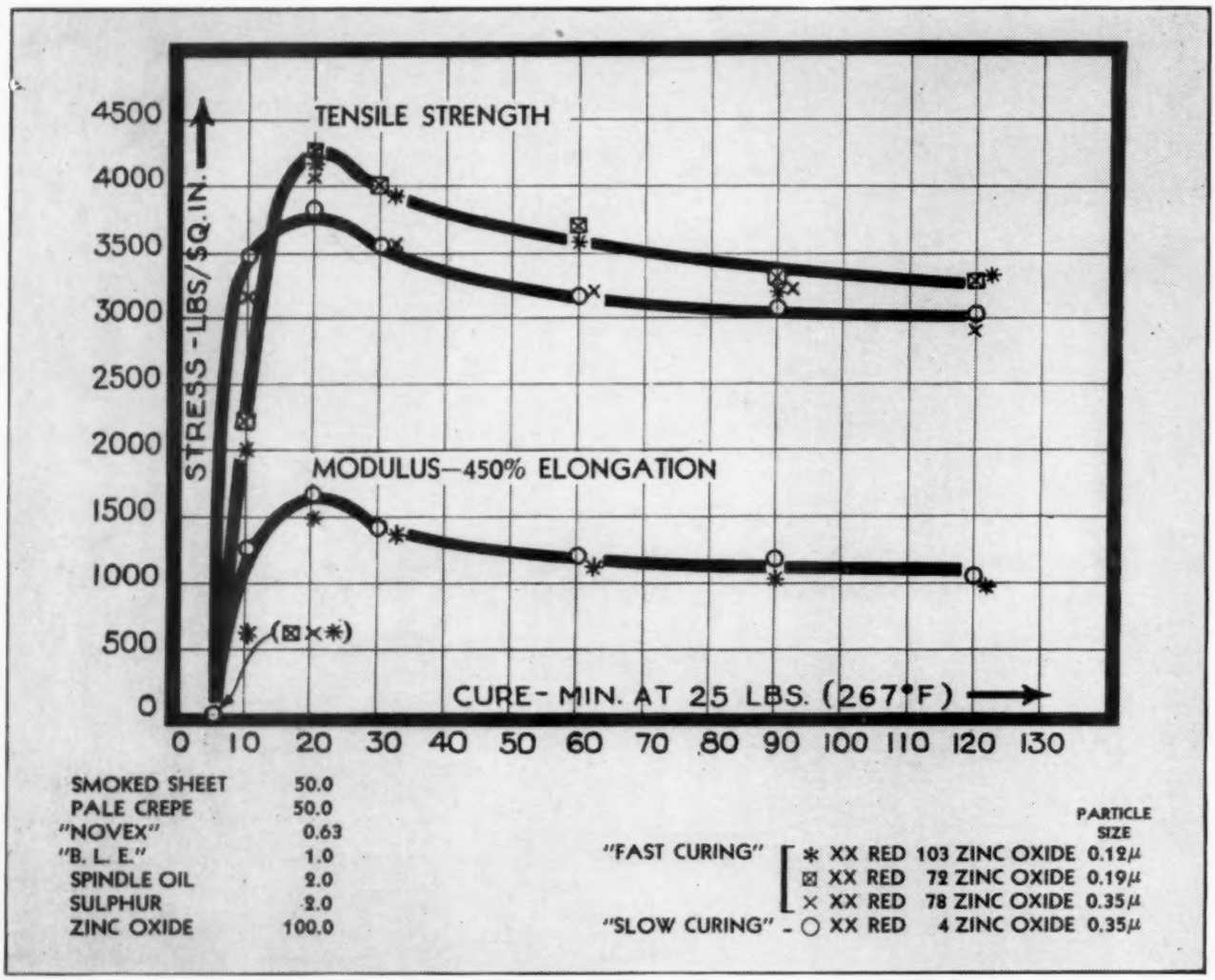
"FAST" and "SLOW" CURING ZINC OXIDES with "NOVEX"



XX Red 103, XX Red 72 and XX Red 78 are substantially pure zinc oxides; they differ essentially in particle size. The compounds with XX Red 103 and XX Red 72 cure at about the same rate, with XX Red 78 somewhat slower. The XX Red 4 compound which contains basic lead and zinc sulphates actually cures faster than the so-called "fast" curing oxides, but on account of coarser particle size does not give as high tensile properties. The flatter-curing characteristics of the XX Red 4 compound should be noted.

No. 31 of a series of charts showing a comparison of "FAST" and "SLOW" curing zinc oxides with typical accelerators.

New Jersey Zinc

The New Jersey Zinc Co.
160 Front Street, New York

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Uses of Rubber On "The Brazilian Clipper"

THE FIRST AMERICAN trans-ocean type airliner, constructed by the Sikorsky Aviation Corporation, Stratford, Connecticut, for the Pan American Airways System, of New York City, was launched early in August. Officially termed the Sikorsky S-42, the new giant plane has been christened the "Brazilian Clipper." The huge 19-ton flying boat is the largest transport aircraft yet developed in this country and is said to be the most advanced transport airliner in the world. It is interesting to note that rubber plays a major part in the construction of this immense ship which is destined to return air records to America.

Though it is the largest transport airplane built in the United States the "Brazilian Clipper" is not the largest from the standpoint of passenger carrying. Airplanes are now in use carrying as many as 42 passengers. This Pan American plane carries 32 passengers, in addition to a crew of six including two pilots. It is equipped with four motors of the "Hornet" type manufactured by Pratt & Whitney. In operation it follows the East coast route from Miami to Rio de Janeiro, covering that distance in five days.

Fully loaded the "Brazilian Clipper" weighs 38,000 pounds. It is streamlined, with the tail surfaces attached directly to the 68-foot hull, a departure in airplane construction. The 114.2 foot wing is mounted on a central "turret" and carries wing-tip pontoons for lateral stability on the water. Each of its four engines is capable of developing 720 horsepower. It has a fuel capacity for an operating range of 1,250 miles. There are eight compartments on this huge flying boat.

These facts and figures indicate the intricate construction of the "Brazilian Clipper." It can readily be understood that every minor application on such a project must approach near perfection. The use of rubber, in dozens of applications, helps materially in approaching such an engineering task.

Some of the innumerable places where rubber serves as the required material on the plane include such applications as shock absorbers, grommets for wiring, instrument vacuum lines, gas and oil connections, welt for strut fairing, rubberized curled hair for seats, shock absorber cord, insulated absorber cord, channel for window glass, stripping, and, of course, tires for both landing gear and beaching gear.

The Sikorsky S-42, popularly known as the "Brazilian Clipper" bears the distinction of being the first American airliner.

Channel rubber used on the window glass (and the Sikorsky S-42 is liberally supplied with windows on both sides of the plane, as may be seen from the illustration) was manufactured by the H. O. Canfield Company, Bridgeport, Conn. Type supplied was the regular grade featured by the company, according to H. J. Donnelly.

Stripping for use in various applications, including the welts used for strut fairing, was furnished by the Continental Rubber Works, Erie, Pennsylvania. Paul H. Henkel, general manager of the Erie concern, advises that regular type rubber stripping was used in this application.

Fink-Dumont-White, Inc., New York, sales agent for

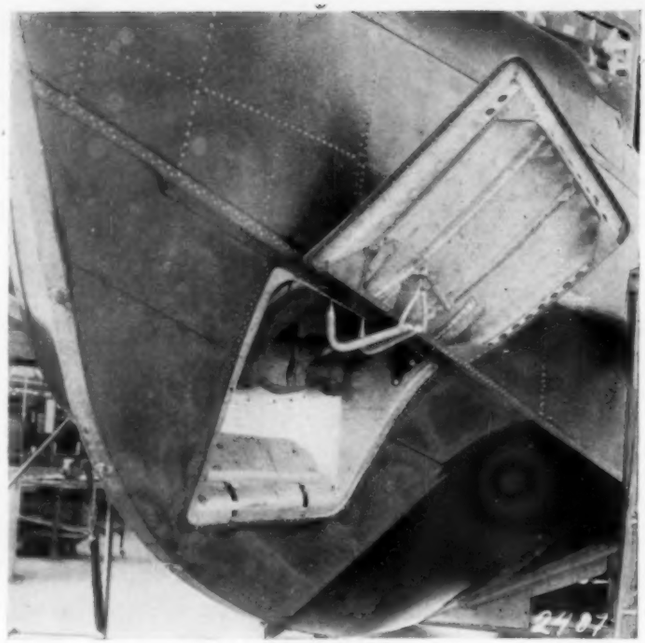
the Protectoseal Company, Chicago, supplied "Protectoseals" for the new flying boat, which, incidentally, is not considered an amphibian type, but is referred to as a "monoplane flying boat." A "Protectoseal" is a circular disc which uses a rubber adapter or collar. Antioxidants are used in the rubber compound. These discs are used as protective caps on the gas and oil tanks, the rubber seal effectively preventing possible leakage or evaporation which the gasoline is subjected to due to the altitudes reached and temperature changes which result as the airplane pursues its course down the coast of South America. There is said to be no ingredient in the rubber compound to prevent the action of gasoline from either deteriorating or softening the rubber since is has not yet been found necessary to follow such procedure. "Protectoseals" are known in the industry as gas filler cap aprons.

The Blocksom Company of Michigan City, Indiana, supplied rubberized curled hair for the seats used on the plane. These seats are widely spaced in the eight large compartments which are sectioned off from the pilot's cockpit.

An interesting rubber application is made in the case of the instrument board for anti-vibration and absorption. The shear type of rubber suspension, featured by the Lord Manufacturing Company, Erie, Pennsylvania, is utilized in this connection. According to the Lord concern, rubber has much greater ability to absorb vibration in shear than when stressed in any other way. Shear rubber, as used in the mountings on the Sikorsky S-42 instrument panel, is said to give the softest rate of deflection and therefore provides the lowest natural frequency.

The instruments mounted on the panel in the new flying boat are arranged symetrically in respect to weight distribution so that neither the top or bottom of the panel are heavy or one-sided. All connections to the instruments terminate in rubber couplings. The Lord shock absorbers are mounted in a plane parallel to the instrument board and pass through the center of gravity of the board. Lord plate form mountings are especially designed for such instrument installations. A washer-like metal plate and a central metal tube are connected by rubber bonded to the tube and plate. In use, the rubber is disposed to yieldably sustain the major vibratory thrusts in shear. This it accomplishes in the Sikorsky application.

Dump valves on the Sikorsky S-42 are equipped with rubber gaskets.



Rubber stripping on the anchor door guarantees seal-tightness while additional stripping is used on hatch covers and doors.

In addition to rubber tires used on the landing gear of the latest Pan American air carrier, tires play another part in connection with the plane. The five principal ports of call have been provided with a specially-constructed beaching gear. This equipment is used to bring the flying boat from the water onto the land for purposes of repair, inspection and overhauling.

The beaching gear was designed by the Sikorsky Aviation Corporation. It is three-pointed in construction and is equipped with 40x10 dual tires in front and a single 40x10 ten ply tire in the rear. All tires used, both on the plane and the beaching gear, are furnished by the B. F. Goodrich Company, Akron.

Other Goodrich rubber, used on the "Brazilian Clipper," includes fuel hose, floor matting, grommets and channel rubber for various uses. Channel rubber and rubber stripping are used in connection with the anchor box door (the flying boat is equipped with a regular type of anchor for mooring purposes), inspection windows, hatch covers and bulkhead doors. Port holes on the plane also use rubber stripping for anti-vibration purposes.

Additional applications of rubber on the Sikorsky S-42, as well as practically all types of airplanes of late construction, include shock absorber cord, dump valve gaskets, instrument vacuum lines, rubber insulated electric wires, etc.

In preliminary tests the "Brazilian Clipper" easily lifted a load equivalent to 100 passengers, and on trial runs has already established two new world records for load and altitude. With a record payload of 8 tons aboard it took off in 23 seconds and climbed to a record altitude of 16,000 feet. With a payload of 5½ tons it reached a world record altitude of 21,800 feet.

As a long range passenger airliner, the recently-launched giant flying boat will carry 2,000 pounds of mail and express (in addition to its 32 passengers and crew), a distance of 1,200 miles non-stop at a minimum cruising speed of 145 miles per hour.

The use of rubber in the various applications mentioned, has materially aided in making possible an airliner of such dimensions to accomplish the feats above described.

Rubber as a Chemically Resistant Material

A Treatise on the Characteristics of Rubber from the Standpoint of Its Chemical Resistance

By Dr. D. F. Twiss

Chief Chemist, Dunlop Rubber Co., Ltd., Birmingham, England

(The accompanying article, read in the form of a paper at a joint meeting of the Chemical Engineering Group and the Birmingham Section of the Society of Chemical Industry, London, on March 23, 1934, is an excellent review of the properties of rubber which make it of such great value as a chemically resistant material for use in the chemical engineering field.—EDITOR)

IN VIEW of its chemical composition and physical properties the resistance of rubber to chemical agencies is remarkable. Well-prepared raw rubber which normally is to be regarded as rubber in the form showing a maximum proportion of unsatisfied valencies, without the aid of artificial protective agents, has resisted atmospheric exposure without appreciable chemical alteration for more than a century. Direct sunlight, however, activates the latent double bonds.

In view of the frequent recurrence of rubber in recent discussions of new structural materials for chemical engineering, it is perhaps surprising to find that rubber was already used for such purposes more than one hundred years ago, in the earliest years of the rubber manufacturing industry. Thomas Hancock in 1823 patented the application of a mixture of rubber and pitch to ships' bottoms as a protection of the timbers (under the metal sheathing) against the ravages of worms. In his "Personal Narrative" written in 1856, he also describes the protection of iron, on ships etc., from damage, by a sheathing of rubber ½ in. thick; the use of rubber gloves, aprons, hose, buckets, sink valves, washers for steam joints, etc. is also recorded. A screw steamer by Messrs. T. B. Palmer & Co. of Jarrow fitted with vulcanized rubber valves and sometimes working over 100 strokes a minute, travelled in 4 years upwards of 100,000 miles. About the year 1825 Messrs. Barclay & Co. had in constant use some 1800 ft. of rubber beer-hose which had just displaced the earlier leather hose. Hancock's "Personal Narrative" also describes, among other articles, hard rubber (ebonite) stop-cocks, tubing, pistons and valves for use in chemical work. Concerning ebonite, he comments: "The properties of this material are: resistance to the action of hot and cold acids, alkalis or chemically impregnated solutions, the sulfur in gas, and it is suited to any uses in which metals are objectionable" ("Personal Narrative," p 174).

Almost contemporaneously in U.S.A., Charles Goodyear, whose ventures into business were however less happy than those of Hancock, described in his book "Gum Elastic" such articles as rubber- and ebonite-protected phials and demijohns, also ebonite sieves "highly useful for straining or cleansing articles or chemicals that corrode and destroy haircloth or wire sieve" and buckets. He further describes "enameled ware" in which metal was coated with a smooth hard coating produced by concurrent oxidation and vulcanization of a film of rubber *in situ*. The principle of this method, which gives an attractive finish, although the coating relative to ebonite is somewhat deficient in chemical resistance, has been revived on more than one occasion of recent years.

T. Hancock, in spite of his justified optimism, realized the danger of over-enthusiasm of certain contemporary irresponsible "inventors" and found it necessary to issue a warning against ill-founded claims which would only bring the new material into undeserved discredit. If rubber had then been less expensive and obtainable at a price even approaching that ruling today—and if chemical engineering and rubber compounding had been as highly developed as they have now become—there can be little doubt that rubber would have occupied long ago a forefront position among the constructional materials of the chemical engineer. In considering a constructional material it is evident that physical and mechanical factors are at least as important as the chemical behavior. The term "rubber" is applied to a range of materials of widely differing physical character, the degree of modification being controllable by adjusted compounding and vulcanization; it is, therefore, necessary to indicate briefly the respective main features.

Raw Rubber

Raw rubber has a specific gravity near 0.92 and contains approximately 95% of the caoutchouc hydrocarbon $(C_5H_8)_x$ the remainder consisting mainly of protein substances and fatty acids in roughly equal quantities. Raw rubber varies widely in tensile strength, some specimens exceeding 1 kg./sq. mm. Its recovery after stretching is poor and the "permanent set" is marked. Its coefficient of cubical expansion per degree C. under no load is approximately 0.00066, its c.g.s. thermal conductivity approximately 0.00032, and its specific heat 0.50.

It exhibits remarkable resistance to abrasion where the mechanical load is light; sheets of unmilled raw rubber, therefore, afford effective protection to the inside of sandblasting cabinets. On account, however, of the serious softening of raw rubber (especially after milling) with rise of temperature, its hardening or "freezing" at temperatures approaching 0° C., its susceptibility to physical attack by many organic liquids, and its very gradual absorption of a considerable proportion (up to 20%) of water, soft vulcanized rubber is generally preferred for constructional purposes. Ten years or so ago however, prior to modern improved methods for attachment of vul-

canized rubber to metal, wooden tanks lined with vulcanized Parà rubber were frequently used for storage of acids, particularly hydrochloric acid. By removing the non-caoutchouc constituents and blending with mineral wax the resistance to water can be improved so that it can be used as a diluent for gutta percha without impairing the features which render that hydrocarbon so suitable for long distance electric cable insulation (A. R. Kemp, *J. Franklin Inst.* 1931, **211**, 37).

Soft Vulcanized Rubber

The vulcanization of rubber leads to a great improvement in its mechanical qualities, particularly with respect to resistance to permanent deformation. The vulcanization process needs to be under exact control because in under-vulcanized or over-vulcanized rubber the tensile and ageing qualities are likely to be impaired. The hardness increases continuously with progressive vulcanization until with chemical saturation by sulphur the condition of ebonite is reached. The nature of the alterations is indicated diagrammatically in the figure, where the curves indicate the course of alteration in tensile strength, extensibility, and resistance to ageing with an increasing proportion of combined sulphur. On account of the augmenting effect of reinforcing agents and accelerators on the tensile strength, and their reducing influence on the extensibility, the general improvement in the ageing behavior brought out by anti-oxidants and other disturbing factors, actual numerical values would apply only to a single mixture in a particular set of circumstances and conditions.

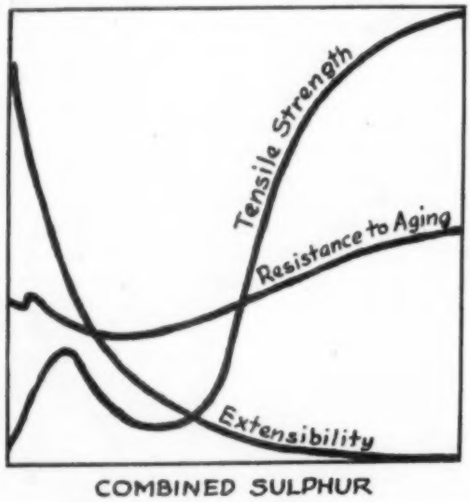


Chart showing course of alterations of properties of rubber with an increasing proportion of combined sulphur.

Soft vulcanized rubber frequently exceeds a tensile strength of 2 kilos./sq. mm. and may stretch to 1000% of its original length. Tensile strength in itself, however, is only of secondary importance for most chemical engineering purposes because where mechanical rigidity is demanded (*e.g.*, in a filter press plate) this can be provided by metal covered with rubber, the latter providing in addition to chemical resistance a degree of elasticity permitting deformation (*e.g.*, by thermal expansion) without rupture. Compounding with reinforcing agents, particularly carbon black, increases the toughness of the rubber and its resistance to mechanical stresses and wear and to solvents.

The "purer" and softer forms of soft vulcanized rubber show excellent resistance to abrasion, especially wet abrasion, under light loads, *e.g.*, for chute linings, sand-blast cabinets, and pebble or ball mills. For heavier work *e.g.*, for covering conveyor belts to carry coke, crushed ore, etc., and for lining tanks likely to contain irregular lumps of hard material, the abrasion resistance can be modified by using soft vulcanized rubber approximating to motor tire tread quality; the especial feature of this is a considerable proportion of carbon black.

Other compounding ingredients of value in chemical rubbers are those of the inert type, such as various forms of silica, barytes, lamp black, graphite, and kaolin; acid-soluble fillers such as whiting are generally to be avoided. Questions of compounding for specific requirements, however, shoud be left to the rubber manufacturer, whose experience and advice should ensure the avoidance of many troubles. Several good acid-resisting rubbers for general purposes are on the market under proprietary names, but advisably should be used with the advantage of consultation with the producers.

Manufacturers of rubber for chemical engineering equipment almost invariably provide tables indicating the limiting concentration and temperature of various chemical solutions to be used with it. Any detailed tabulation is therefore unnecessary here. The following gives a selection of a few typical examples from tables which have been published in a comprehensive consideration of the behaviour of rubber (soft and ebonite) to a wide range of chemical liquids.[1] (See table on next page).

Resistance of Rubber To Various Chemicals

Hydrochloric, hydrobromic, hydrofluoric, and hydrofluosilicic acids of any concentration, sulphuric acid up to 50% and phosphoric acid up to 85% can be safely contained in soft rubber. With nitric acid the behaviour is less satisfactory. Practically all caustic alkalis and chemical salts in aqueous solution (other than those of powerful oxidizing character, *e.g.*, chromates or persulphates, and for these ebonite can be used) can be used in soft-rubber lined tanks. With organic liquids the selection to be used with soft rubber needs to be made more carefully; many, *e.g.*, the hydrocarbon and halogenated solvents, oils (particularly hydrocarbons), and fatty acids rapidly swell soft rubber; it is a fairly safe rule, however, that for hydroxylic and water-soluble organic compounds selected soft-rubber "compounds" can be safely used, although for some, *e.g.*, acetic acid, it is desirable to use ebonite instead of soft vulcanized rubber. Such conditions as reduced pressures, rapidly fluctuating temperature or local differences in temperature are adverse to long life in protective rubber linings. It may be stated that for most purposes a temperature near 70° C. is considered desirable as a maximum; this is dependent however on many factors and in favorable conditions can be exceeded, so that even boiling liquors have been successfully used in vessels with soft-rubber linings.

Of recent years the use of rubber-lined storage and rail tanks for acids, particularly hydrochloric acid, has extended rapidly, the advantages over the older carboy system of handling being numerous and fairly obvious. Hundreds of such tank wagons of capacity up to 8000 gals. are now in use. Other industrial chemical equipment to which rubber linings have been satisfactorily applied include plating tanks, racks, and fittings, vats for dissolving scrap iron in hydrochloric acid, drums, centrifugals, metal piping.[a]

[1] Fritz and Hoover, "Symposium on Rubber," A.S.T.M., 1932, pp. 113-129.
(a) An interesting account of experiments with rubber-lined leaching tanks is given in *India Rubber World*, 1926, 75, 129; 1929, Nov. p. 69; *India-Rubber Journal*, 1930, 79, 807.

CHEMICAL RESISTANCE OF RUBBER COMPOUNDS

SOLUTION	Max. concentration	Max. temp. (C)	Vulcanization	Whether general or specific rubber mixture necessary
Hydrochloric acid.....	any	65°	soft or hard	general
Sulphuric acid.....	up to 50%	65°	soft or hard	general
Hydrofluoric acid.....	up to 50%	65°	soft	general
Hydrofluoric acid.....	up to 50%	65°	hard	general
Chlorine water.....	up to satn.	38°	soft	specific
Chlorine water.....	up to satn.	65°	hard	specific
Aluminum chloride....	up to satn.	65°	soft or hard	general
Alums	up to satn.	65°	soft or hard	general
Ammonium chloride or sulphate	up to satn.	65°	soft or hard	general
Ammonium persulphate.	up to satn.	38°	soft	general
Ammonium persulphate.	up to satn.	65°	hard	general
Potassium dichromate..	up to satn.	65°	hard	general
Ferric chloride.....	up to satn.	65°	soft	specific
Ferric chloride.....	up to satn.	65°	hard	general
Sodium or potassium hydroxide	any	65°	soft or hard	general
Ammonium hydroxide..	up to satn.	38°	hard	general
Copper sulphate.....	up to satn.	65°	soft or hard	general
Acetic acid.....	any	65°	hard	specific
Acetone	any	65°	soft	specific
Acetone	any	65°	hard	general
Amyl alcohol.....	any	65°	soft	specific
Amyl alcohol.....	any	65°	hard	general
Buttermilk	——	65°		
Castor, olive, cotton-seed, or coconut oil..	——	65°	hard hard	specific specific
Citric acid.....	up to satn.	65°	soft	specific
Dyestuffs	——	65°	hard	specific
Ethyl alcohol.....	any	65°	soft	specific
Ethyl alcohol.....	any	65°	hard	general
Glycerol	any	65°	soft or hard	general
Mineral oils.....	——	38°	hard	specific
Soaps	any	65°	soft or hard	general

Ebonite

Fully vulcanized ebonite or "hard rubber" consists of rubber combined with approximately 50% of sulphur corresponding roughly with the formula $(C_5H_8S)_x$. For special purposes it is further modified by compounding. It is remarkably permanent and resistant to ageing.

Some of its features are: sp. gr. 1.15 or over according to composition; coefficient of linear expansion 0.000045—0.00008 per °C., Shore hardness 40—70. Tensile strength up to 8 kilos/sq. mm. The degree of hardness can be modified by variation in the degree of vulcanization; this is sometimes relatively undesirable because under-vulcanization of the ebonite leaves the product short of chemical saturation and so may impair its chemical resistance which however can be combated by artificial preservatives or anti-oxidants. Hardening can be effected by incorporation of mineral ingredients and eliminates any tendency to gradual distortion under tropical conditions. By suitable inert softening agents it is possible to some extent to increase the flexibility and consequent toughness; for this purpose however avoidance of all unnecessary mineral fillers is a useful first step.

Good ebonite is generally superior to soft vulcanized rubber in chemical resistance but not in resistance to abrasion or mechanical shock and it softens appreciably at temperatures below 100° C. On this account and on account of its hardness at ordinary temperatures it is consequently more open to mechanical damage than soft rubber and demands greater care in use. The general working temperature is below 65° C. High proportions of mineral fillers can increase the temperature-resistance very considerably but generally results also in a tendency to greater brittleness.

Its rigidity also calls for careful consideration of its expansion and contraction with variation in temperature; long pipe lines call for expansion joints. Tanks lined with ebonite should be protected from sudden considerable temperature fluctuation. For such reasons tanks lined with ebonite sometimes have an intervening layer of soft rubber which serves to absorb the stresses set up by unequal expansion of the lining and the metal foundation. Another device is to use two layers of "soft" rubber with a sandwiched layer of ebonite; this three-ply construction provides the wear-resistance of the soft-rubber surface with the resistance of ebonite to the action of chemicals; the under-layer of soft rubber prevents undue stresses in the lining and permits more rapid variations in temperature; expansion joints can be provided in the ebonite reinforcement. Heat for liquids contained in an ebonite (or rubber) lined vessel should be supplied direct to the contents and not through the protected wall; rubber-covered warming and cooling coils however can be used (cf. Heastie, *Ind. Chemist*, 1933, **9**, 372).

Ebonite is applicable in and to practically all kinds of equipment; tanks, buckets, dipping baskets, centrifugal baskets, funnels, piping, fans, dyesticks, spools, pumps, taps, pipes, etc. It may be used alone or reinforced with fabric or metal or may merely provide a protective surface for equipment.[b]

Most solvents for raw rubber have an appreciable swelling action on ebonite; neither soft rubber nor ebonite is therefore recommended for use with organic liquids such as ether, benzene, gasoline, or aniline.

Its greater inertness renders ebonite of particular value where a non-staining lining is required, *e.g.*, for fruit juices. Not only does the ebonite not stain on its own account but it resists absorption of colors from colored liquids and so will not contaminate by importing color derived from previous contents. Soft rubber is not so satisfactory in this respect.

For heat insulation purposes at moderate and lower temperatures rubber, whether soft or ebonite, can be applied in "expanded" form containing as many minute spherical cells as to have a specific gravity approaching 0.1. Such cellular rubber is an excellent thermal insulator.

Latex

It would be surprising if the relatively recent availability of rubber latex in bulk had not had some influence on the subject under consideration. Latex itself is not of interest as a protective agent but, on account of its high content of rubber which can easily be caused to separate, it provides an exceptionally convenient medium for the application of rubber to surfaces of all kinds. Its possibilities in this direction, however, still remain to be fully developed.

For the protection of metal objects anodic deposition is a rapid and effective method of obtaining the necessary coating of rubber. Iron or steel surfaces are often given a preliminary coating of zinc but this is not essential. Relatively small articles, *e.g.*, dye sticks, spools for artificial silk, fittings for electroplating, etc. are particularly easily coated in this way, subsequent vulcanization giving a soft or hard rubber (ebonite) coating according to the compounding of the original latex. Anodic deposition of rubber from latex has advantages for rubber-covering metal screens for use with wet materials, *e.g.*, coke. Screens so protected will give service several times as long as one of plain metal. Mixtures of latex with cement can be made capable of being spread and will provide a protective layer or serve as a foundation for the more secure attachment of rubber in sheet form.

Mention must be made of the possibility of vulcanizing a wet coagulum of compounded rubber latex to the ebonite condition under conditions preventing escape of the water. In these circumstances a microporous ebonite is obtained which on account of its surface being interrupted by an immense number of invisible pores, is of light yellow color instead of the normal black. Sheets of such microporous ebonite offer great advantage as diaphragms for electric accumulators and batteries. Its potentialities also for filtration purposes are obvious.

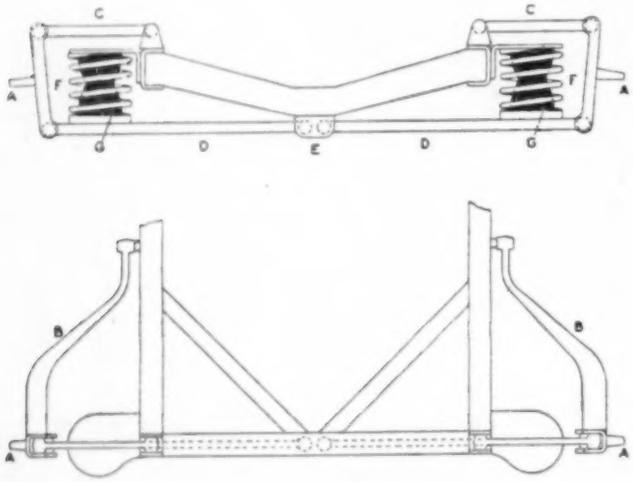
(To be concluded in the November Issue)

(b) For an account of the manufacture of hard and soft rubber equipment for the chemical industry see *Ind. Chemist*, 1929, 5, 229.

Rubber in Independent Wheel Suspensions

AUTOMOBILE MECHANICS AGREE that independent front wheel suspension improves the stability of the front end of a car, allows more body space with improved streamlining, and makes for more favorable weight distribution. These factors simplify chassis design generally. The primary objection, however, to such type suspensions was due to the necessity of modifying existing chassis design. Automobile manufacturers are most reluctant in this particular. A new method, termed the *Andre-Girling* system, has recently been advanced in England, which is said to overcome this objection. The diagram of this system is illustrated herewith.

Referring to the diagram it will be noted that the steering head (A) is located by a longitudinal arm (B) which is hinged to the frame by transverse links (C & D) with Silentbloc rubber bushings. The inner ends of links (D) are fitted with spherical metallic bearings (E). The wear



on these bearings is said to be negligible. The coil springs (F) are made more effective by the introduction of supplementary rubber buffer springs (G) which absorb the hard shocks; the metal springs provide for the slighter road shocks. The shape of these rubber blocks has been carefully designed to produce the best results. Rubber pads are also fitted at the top and bottom of the coil springs to prevent metallic contact.

Use of rubber in this suspension system obviates the need for fitting powerful shock absorbers. Steering control and braking are so operated that they are practically unaffected by any vertical movement of the front wheels.

Reinforced Rubber Water Pipes

AN INTERESTING INVESTIGATION, conducted by D. J. Murnane, C. E., at Singapore, revealed some interesting data on the efficacy of reinforced rubber piping for underwater use. According to Mr. Murnane, who is the Singapore Municipal Water Engineer, a 4-inch pipe of this type was immersed in a particularly foul sea bottom where other connecting pipes have required frequent renewal, and left there for forty months. The rubber piping withstood a test pressure of 100 pounds per square inch after being removed from the depths and appeared to be as good as new. The experiment served to prove that the most economical and permanent solution of many submerged pipe-laying operations lies in the use of reinforced rubber piping.

Rubber Industry of Mexico

THERE ARE ABOUT 18 manufacturers in Mexico today specializing in the production of rubber goods. Only 4 are said to be relatively large in size, in comparison with the others. These 4 produce automobile tires and tubes, in addition to other products. At the present time rubber manufacturers in Mexico are producing such items as rubber shoes, heels, water bottles, raincoats, floor coverings, automobile accessories, erasers, hose, and belting, as well as tires and tubes for automobiles, bicycles, carriages, etc.

According to the Department of Commerce, the smallest Mexican tire manufacturer has a daily output of no less than from 10 to 20 pneumatic casings *per diem*, while the largest has a daily production schedule approximating from 125 to 130 tires. The industry is well able to take care of Mexican requirements in tires judging from imports of pneumatic tires: 1,125,354 kilos in 1932; 687,612 kilos in 1933; and only 185,017 kilos in the first five months of 1934.

Imports of crude rubber by Mexico during 1932 amounted to 871,095 kilos, while 2,006,733 kilos were imported in 1933. Importation figures for 1934 are not as yet available, naturally, but estimates indicate that approximately 2,250,000 kilos will be the total figure based on 1,358,125 kilos imported during the first five months of the current year. These figures indicate the growing importance of the rubber manufacturing industry in Mexico.

Changes in Volume of Rubber

THE NATIONAL Bureau of Standards recently completed a study of the way in which the volume of rubber changes with changes in temperature. This study sheds considerable light on the forms in which rubber may exist at different temperatures. It has long been known that when unvulcanized rubber is cooled slowly, it undergoes a change similar to freezing, but when cooled quickly it may remain in the ordinary, elastic form.

In the present investigation described in the September, 1934, issue of the *Journal of Research* (RP717), precise measurements have been made of the relative volumes of the two forms of rubber at temperatures down to —84° C (—120° F.). Rubber in the crystalline form has been found to occupy a volume 2 to 3 per cent less than in the elastic forms.

The transition of frozen rubber back to the ordinary form does not occur at a definite temperature, but takes place gradually from 6 to 16° C (43 to 61° F).

When both the ordinary and the crystalline forms of rubber are cooled to —73° C (—100° F) or below, they undergo changes to still other forms which are characterized by much lower coefficients of expansion than the products from which they are derived.

Vulcanized rubber, unlike crude rubber, does not crystallize on slow cooling but it does undergo a change to another form at a temperature somewhat above —73° C (—100° F). The temperature at which the change occurs depends on the percentage of sulphur used to vulcanize the rubber.

The fact that rubber may exist in different forms, as shown by temperature-volume measurements, is of general and basic significance. A close correlation has been found between present results and such diverse properties of rubber as the heat capacity, the dielectric constant and the behavior on stretching.

Uses of DuPrene Increasing

Reviewing Some of the More Important Industrial Uses Which Have Been Found for du Pont's Synthetic Rubber

TWO and one-half years ago the du Pont Company announced the development of DuPrene, a synthetic rubber equal to natural rubber in practically all respects and superior to it in many ways.

Since that announcement, states E. R. Bridgwater in the October, 1934 issue of *The DuPont Magazine,* DuPrene has demonstrated its unusual properties to scores of rubber manufacturers who now use it for hundreds of products that were formerly made of natural rubber. Much has, of course, been published on the advantages of DuPrene and the properties it gives to rubber compounds but little has appeared heretofore on actual industrial products in which the synthetic rubber has been incorporated on a commercial scale. A review, therefore, of the use of DuPrene, in replacing natural rubber or supplementing it in the manufacture of certain types of rubber products is of interest at this time to the rubber industry.

The manufacture of hose for conveying liquids is an important branch of the rubber industry. So long as hose is called upon to convey only water or other inert liquids, rubber is an entirely satisfactory material of construction unless the exterior of the hose is constantly exposed to strong sunlight, as in the case of golf-green hose, or to the oils and chemicals which are encountered in many industrial plants. However, when we come to hose for conveying gasoline and oils, the shortcomings of rubber are immediately apparent. This difficulty has been partially circumvented by building gasoline and oil hose with a semi-flexible metal inner tube and by other devices that have increased the weight, decreased the flexibility and increased the resistance to flow through the hose.

Today, hose is being built with a smooth inner tube of a DuPrene compound that resists the action of oils and solvents. It is made in various types for conveying gasoline, crude oils, fuel oils, lubricating oils, kerosene, and the like.

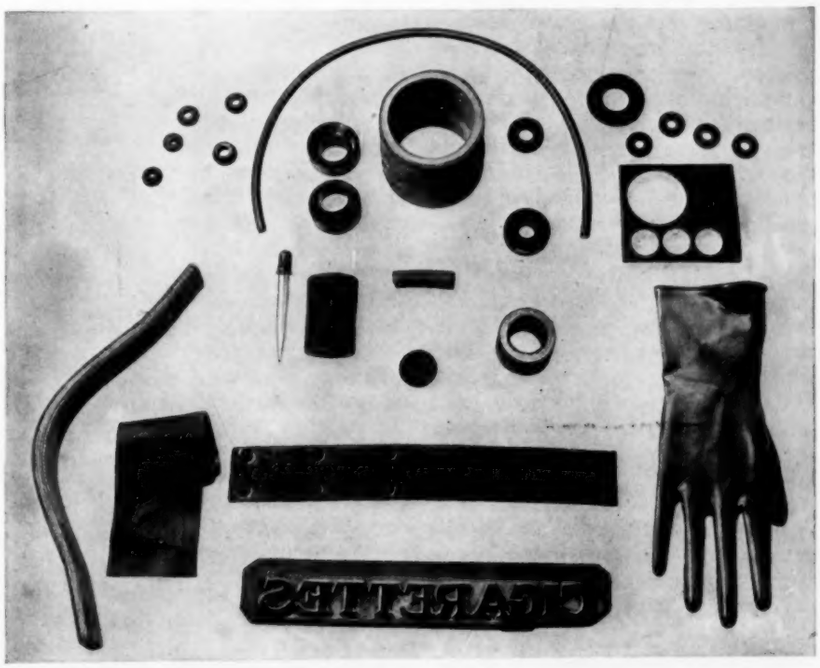
The rapidly growing use of propane and butane as fuels for bus and truck engines, especially in the far West, has made it necessary to develop a flexible connection for handling these light petroleum products either as gases or, more commonly, as liquids under pressure. Rubber is not entirely suitable for this purpose, not only because it is deteriorated by propane and butane, but also because they diffuse rapidly through it with resultant large losses. This problem has been solved by the development of hose in which DuPrene is used in place of rubber. It is unaffected by these hydrocarbons and is only about one-fifth as permeable to them as one made of rubber.

Aside from crude oil and refined petroleum products, many other liquids that attack rubber are being handled without trouble in flexible hose with a DuPrene lining. DuPrene has been successfully used in contact with a variety of synthetic organic liquids, vegetable oils and animal oils. For example, paint-spray hose with an inner tube of a DuPrene compound successfully resists the action of linseed oil, turpentine and Duco thinner.

Another industrial use for these compounds is in packing. An asbestos sheet packing made with a DuPrene binder in place of rubber has been found to be more resistant to oils and to high temperatures than the conventional rubber-bonded asbestos sheet. Plain DuPrene sheet packing and cloth-inserted DuPrene sheet have also found a variety of industrial uses. Rod packings of various types, impregnated with DuPrene, have shown superiority in installations involving exposure to oils or high operating temperatures which would rapidly deteriorate rubber. A closely-related group of DuPrene products are gaskets, pipe rings and sealing rings which are molded in a variety of styles. They are finding extensive use in automobiles and in the gas and petroleum industry. Other molded mechanical products in which DuPrene is being used to advantage include air-compressor piston cups, pump diaphragms, valve disks and gaskets, and bibb washers.

Cotton and asbestos fabric may be calender-coated with DuPrene and vulcanized in hot air. Products made in this manner are used for a wide variety of purposes, including protective aprons for workers in creameries and other plants, valve diaphragms, seals for oil-tank floating roofs, and generally, wherever a thin flexible sheet is required to be impermeable to gases, unaffected by oils and resistant to oxidation and sunlight deterioration.

DuPrene has also been applied successfully to power



Among articles which now incorporate DuPrene in their manufacture are included conveyor belts, brake lining, piston cups, gaskets, insulated wire, gloves and medicine droppers.

transmission belting. Both the raw edge and folded types are made, the first type having a DuPrene friction between each ply of fabric and the second having usually only a DuPrene friction on the outer ply. DuPrene belt frictions develop a slightly tacky surface at operating temperatures. This improves the coefficient of friction between the belt and the pulley. Such belts, of course, have the added advantage of being resistant to oils that may come into contact with them.

Another important use for DuPrene is in the manufacture of covered rolls for use in the textile, paper and other industries wherever there is need for a resilient roll covering that is resistant to oils and chemicals.

It has also found important uses in oil-well drilling accessories such as packers, pistons, swab cups and sealing plugs.

Insulated wire covered with an oil and acid-resisting DuPrene compound is used for oil-well shooting and for a variety of other industrial purposes such, for example, as portable cable for use in garages and machine shops. DuPrene wire insulations are not only oil resisting but have many times greater corona resistance than rubber insulations, which has brought about the use of a DuPrene jacket or sheath on ignition cable, neon sign wire and other high-voltage conductors.

Only a few of the more important uses for DuPrene that have already been developed are covered by this short review. Others are constantly being found not only in the du Pont laboratories but also by engineers in every branch of industry.

Butyl Zimate—Latex Accelerator

A NEW ORGANIC accelerator, called Butyl Zimate, has recently been announced by R. T. Vanderbilt Company, New York City. It is especially designed for use in latex compounding. The use of ultra-accelerators for dry rubber mixes is likely to result in scorching on the mill but this danger is not present with the same material when used in latex mixes, according to the producers. In fact, it is usually the aim to get the fastest possible cure in latex-deposited rubber and at reasonably low temperatures.

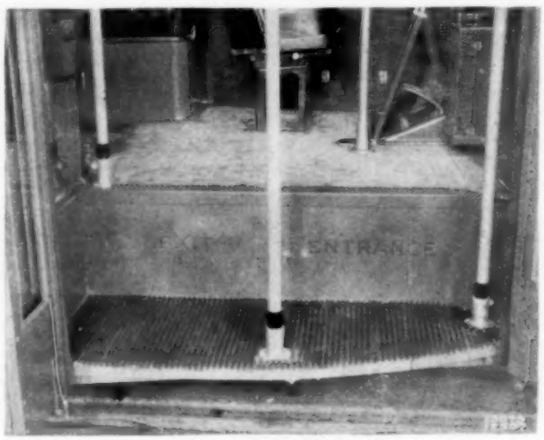
Butyl Zimate is the zinc salt of dibutyldithiocarbamic acid and is a higher homologue of ordinary Zimate (zinc dimethyldithiocarbamate). It is a cream colored powder having a melting point of 105-108° C. Recrystallization from benzene raises the melting point to 110° C. The specific gravity is 1.24. It is insoluble in water but has considerable solubility in benzene (over 30 g. per 100 c.c.), gasoline (2.7 g. per 100 c.c.) and in rubber (over 2 per cent).

In this latter respect Butyl Zimate differs materially from ordinary Zimate, which is only slightly soluble in these materials. The greater solubility of Butyl Zimate in rubber doubtless largely explains its strong curing activity, which is greater, pound for pound, than that of ordinary Zimate, tests showing it is much too fast for use in dry rubber compounding.

According to its manufacturers, when used in latex mixes, Butyl Zimate is said to give fast cures at low temperatures. Good cures may be obtained by using 0.5 to 1 per cent of sulfur and from 0.5 to 1 per cent of Butyl Zimate (on the dry rubber content). Cured films from such compounds have unusually high tensile strength. The curing temperature for dry films may vary over a wide range, but good cures can usually be obtained in short times at temperatures from 70° to 100° C. The aging of compounds cured with Butyl Zimate is exceptionally good and is improved as the sulfur ratio is reduced.

Melflex Non-Slip Safety Treads

IN the same manner that the pneumatic tire has replaced the steel wheel so have rubber safety treads replaced the metal bases formerly used on mounting platforms of busses and coaches. The Melflex Products Company, Akron, has been manufacturing a special "Non-Slip Safety Tread" for the past six years and this equipment has been



specified by many of the larger bus operators including the Greyhound line and the Akron Transportation Company. They are supplied as optional equipment by many of the larger bus and body manufacturers.

Melflex Safety Treads are made from strong cotton cords embedded in a long wearing rubber compound, vulcanized and cut into strips. Each strip is dipped in a special rubber cement and molded into a tough rubber base. The strips in the tread are separated by grooves approximately 3/8 inches wide. The individual cords in the strip are placed up higher than the surrounding rubber base. The grooves between the strips collect the moisture, sand, grit and dirt carried on to the mat leaving the surface free and clear to firmly grip the foot or shoe.

In addition to platform mats used by busses, coaches and street cars, these treads are applicable generally in industrial plants as safety guards, and may also be utilized around shower baths, switch boards, etc.

Powdered Rubber Produced in Ceylon

FIRST consignment of powdered rubber produced in Ceylon, India, has been received in London. The material was produced by the de Schepper process on the property of the Dangan Rubber Estates, Ltd., and was consigned to the Rubber Powder Company, Ltd., in London. The de Schepper process enables the powder to be made direct from the latex with or without ammonia. Only a small percentage of zinc stearate is contained in the finished powder to prevent coagulation and massing in transport. Since zinc stearate is used in the manufacture of rubber products to a great extent its appearance in the powder is not detrimental.

Rubber in this granulated form is obtained by spraying the latex on to a stainless steel belt, which passes into a tunnel heated to a required temperature for drying. The grains formed from drops are brushed off the belt when emerging from the tunnel. The entire process is automatic and eliminates smokehouses, drying lofts, heavy machinery, acids, chemicals, etc., on the plantation. In its granular form rubber eliminates the masticating process by heavy machinery necessary to the production of particular rubber articles.

Rubber Growing in United States

A Review of the Rubber Plants Grown in the United States and Their Estimated Production in the Event of Exorbitant Prices

THE UNITED STATES is in a fair position, which will be materially improved in the next few years, to produce a good share of its rubber requirements, according to the United States Department of Agriculture. In the event that the restriction scheme forces prices to exorbitant levels this country will be prepared to effectively continue rubber manufacturing activities without counting solely on foreign sources for its required supply.

These statements are attributed to the fact that the Department of Agriculture has been conducting a wide series of experiments for the past several years which included practically every important plant used for commercial production throughout the world. Independence of supply, other than the production of synthetic rubber, is the aim of virtually every manufacturing country producing rubber goods.

Plants which the experimenters of the government agency have selected as giving the most promise for sources of rubber include goldenrod, guayule and hevea. The first named plant is found in all parts of the country, the second is a shrub which grows profusely in the Southwest, while hevea plants are related to the rubber trees of the tropics.

Of the three plants named, goldenrod is expected to develop as the most promising commercially-adaptable rubber source. The Department of Agriculture was recently the recipient of the Edison collection of goldenrod selections. This transfer has given new impetus to the research program being conducted in conjunction with the testing bureaus under government supervision.

Rubber of good quality has been made from goldenrod, but the details of extraction and manufacture have not been developed sufficiently to produce rubber on a commercial scale. With present knowledge it would not be possible to make rubber from goldenrod at prevailing prices of about 15 cents a pound. However, experiments now in progress in the Department lay the foundation for domestic rubber production in case of an emergency.

Guayule is a shrub native to Mexico and southern Texas which resembles sage brush and which can be harvested with machinery. Several thousand acres have been planted to guayule in California by a company interested in its development. (Continental Rubber Company of New York.)

Other Rubber Sources

For maximum yields, guayule is harvested only every fourth year, thus it would be necessary for farmers to have some assurance of a stabilized price before this crop would be grown on a large scale. Because the whole plant is harvested it is necessary to have a large area and a succession of plantings to insure a continuous harvest. It is a long-time, large-scale rotation.

Other sources of rubber which could be developed in this country, if the price were high enough to warrant it, include the Hevea, the famous rubber tree of the tropics. The Department now has 30,000 of these trees growing in Florida, some of them from seed produced there. There is every reason to believe that they will yield as well as those in the East Indies.

Another rubber tree which grows well in Florida is the Castilla, from Central America. It is not so resistant to frost as hevea, but it has a big advantage in that it yields a large percentage of its rubber at one tapping, a factor that would help to cut labor costs.

Rubber made from guayule and goldenrod in this country so far has not been as good as plantation rubber. With continued improvement in methods of extraction, however, it is entirely possible that domestic rubber from these plants might be made to approximate that from the East Indies, in the opinion of L. G. Polhamus, who for several years has been engaged in a study of rubber plants for the Department of Agriculture.

Solidago Leavenworthii

So far, Solidago leavenworthii, one of the Edison selections, has the highest rubber content of any of the goldenrods analyzed. Specimens have produced more than 12 per cent rubber. Another species, S. fistulosa, a selection by the Department, has analyzed as high as 9 per cent rubber. A third species which yields from 4 to 6 per cent rubber is considered promising because of its greater leaf production.

In spite of the popular interest in goldenrod as a source of domestic rubber there are many problems which must be worked out before we can look to this plant for commercial production of rubber, Polhamus believes. In the last few years he has laid the groundwork for genetic studies which are the basis of any intelligent breeding program. The Edison collection represents only a careful selection of outstanding individual plants. With the same scientific effort that is applied to the crossing of such plants as wheat and corn it seems reasonable to expect results with goldenrod far more promising than anything yet achieved.

Goldenrods are native to all parts of the country. Most of the plants studied for rubber production have been grown in the South, either in Florida or South Carolina, but it is entirely possible that plants from other sections would do equally well for making rubber. Cost of land and labor would be important items in selecting a locality for growing goldenrod commercially.

Department officials emphasize that the goldenrod experiments have not progressed far enough to warrant anyone going into the business of growing or collecting goldenrod to sell for making rubber. They also point out that they have no goldenrod plants for distribution.

In experimenting with goldenrod many problems have arisen, which appear in almost every case when a plant is domesticated. Insect and fungous enemies may do little damage when the plant is wild, but once it is concentrated in cultivation these attacks become serious. Several root, stem and leaf diseases have been found in goldenrod plantings in Florida and South Carolina. Leaf diseases are especially disastrous because rubber is formed increasingly in the leaves as they mature, and it is necessary that the

leaves remain on the plant as long as possible.

Because of the uncertainty of reproducing desirable strains of goldenrod by seed, vegetable methods have been used. The underground stolons, which are produced freely, propagate readily. As many as 500 new plants have been grown in a single year from the stolons of a single plant of Solidago leavenworthii, growing at Fort Myers, Florida. Plants grown from stolons produce a crop of rubber the first year.

When goldenrod is brought into cultivation there frequently is a striking change in growth habit of the plants. Those that grew upright in the wild often show a tendency to fall over, particularly when favorable growing conditions are present. Such plants sometimes show a decrease in rubber content of the leaves, although they grow vigorously and produce many more leaves.

Experiments at Charleston, S. C., by the Department give some indication of the effect of soil and cultural conditions on the production of rubber in goldenrods. Plants similar in every respect were grown on high sandy soil and low, moist soil. Those on the high land had a higher percentage of rubber in the leaves but because of the more vigorous growth on the low soil these plants gave a larger yield of rubber per plant.

The experiments at Charleston showed practically no response to fertilizers. Plants grown on a good grade of sandy loam where 400 to 500 pounds of fertilizer would ordinarily be used for cotton made a good growth, with or without fertilizer but there was little difference where no fertilizer was used.

In his breeding work so far Polhamus has learned much about the outward characteristics of goldenrod. He knows how to make them tall or short; bushy or open. But he has not yet discovered how these plants manufacture and store rubber. Neither is it clear as to the conditions under which the greatest amount of rubber is produced. Until these are known breeding of high yielding goldenrod will be difficult.

To show something of the task facing him, Polhamus tells of planting a seed in 1932, from which a nice clump of plants grew in 1933. These plants he knew were genetically identical—which meant that they should behave alike. He harvested all the same day because he had learned that the time of harvest often influenced the percentage of rubber. They ranged from 1.07 to 3.55 per cent rubber, in spite of the fact that they were genetically identical.

There are two general processes for extracting rubber from plants. With the mechanical method, used with guayule in Mexico and California, the plants are ground up and macerated in a pebble mill. The rubber gathers into small lumps which can be separated from the powdered woody material by flotation in water.

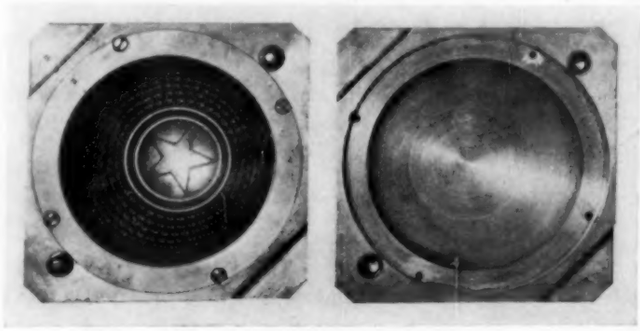
The other method is to dissolve the rubber out of the plants by chemical solvents. This is the method best adapted for use with goldenrod.

Cocoa Soapstock as Mold Lubricant

COCOA SOAPSTOCK, a material containing a large percentage of cocoanut oil saponified with alkalis to give a pure hard soap, makes a suitable product for lubricating molds to prevent sticking of the vulcanized stock. Properly made, without any traces of sodium silicate, it will not cause caking on the molds. The recommended quantity is 8 to 12 pounds to a 55 gallon drum of water. The soap is dissolved in water by cooking either by open steam or external heat of some kind. For easy spraying the solution is kept warm by steam or a small electric heating unit can be applied at the spray nozzle to prevent clogging.

Producing Low Cost Rubber Molds

EXPERIMENTATION, some years ago, convinced Joseph W. Bishop, former chief engineer for the Brunswick-Balke-Collender Company, that molds could be produced economically and with considerable speed, but being occupied in other activities at that time he did not experiment further. He did, however, file away his idea for future reference and resurrected it a little more than a year ago.



Working with Vernon L. Tannehill, general manager of the Fort Wayne Engineering Company, Mr. Bishop has now perfected a new process whereby rubber molds can be produced with surprising rapidity and at comparatively low cost. As a result Process Molds, Inc., was organized and a factory located in Fort Wayne, Ind., is now in operation.

Months of experimentation resulted in developing special equipment for the electro-deposition of nickel-iron. Process Molds now using this method turns out a heavy casting which reproduces with perfect registration every detail of the pattern. More than that, these electro-deposition molds are made so accurately and with such speed that whether the pattern contains minute details or is comparatively smooth has no appreciable effect on the production cost.

Delicate and intricate details have been reproduced with great exactness. Toys of various shapes and designs, balls, sponge rubber articles and plastic art objects of various kinds have been made satisfactorily in the new type molds.

Either drawings or photographs are used to develop the pattern with the electro-deposition taking place directly from the original. Special equipment, developed for the deposition of the nickel-iron, allows absolute control of that phase of the process and checks too rapid development of the casting. Over a year of experimental work was needed to arrive at the proper bath solutions which would prevent oxidation of the metallizing surface.

Flame-Proof Rubber Tiles

CONSISTENT tests have been conducted by Messrs. Johnson and Philips, Ltd., of England, cable manufacturers, on rubber tiling in an attempt to render them flame-proof. It has been found that when rubber flooring is impregnated with "Seekay" wax (a non-inflammable chloronapthalene wax produced by a subsidiary of Imperial Chemicals, Ltd., London) the rubber is made flame-proof. The term is used to imply treatment to resist flame and prevent it from spreading along the material treated. Impregnation with "Seekay" wax is an extension of the process already successfully applied to electrical cables and can be carried out without detriment to the color or surface of the rubber or to its flexibility and tensile strength qualities.

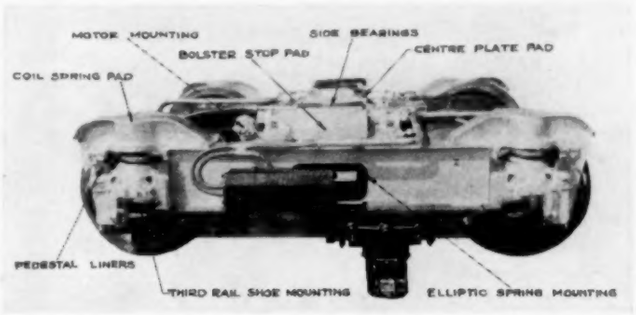
Rubber Parts Used in Budd Train

IN A PREVIOUS issue of THE RUBBER AGE (June, 1934) was described the streamlined, stainless steel train, which liberally utilized various rubber parts, manufactured by the Pullman Company for the Brooklyn-Manhattan Transit division of the New York Rapid Transit Corporation. Mention was also made of a second stainless steel train made for that organization by the E. G. Budd Manufacturing Company, Philadelphia, but a description of the rubber parts used in this second train was not available at the time. Having secured such information, recently, we present it herewith.

One of the chief reasons for the use of rubber in the new streamlined trains now in operation is its effect in lowering the noise level. Deadening of noise is of greater importance in trains intended for use in subways than for those used on steam roads. The roadbed in subways is extremely hard and lacks resilience, with rails attached directly to the bedrock in many cases. Noise arising from the trucks is naturally confined and amplified by subway tunnels. Bearing this thought in mind Budd engineers lavishly sprinkled the B.M.T. high-speed, stainless steel train with rubber parts.

As in the case of the Burlington Zephyr carefully designed alloy steel coil and elliptic springs were used to provide riding comfort. Rubber in compression was used to dampen high frequency oscillations and noises which are not stopped by springs. Rubber pads of considerable thickness were utilized under the center plate bearings and over the elliptic springs in the truck. These were found to be particularly valuable in insulating vertical oscillations. Pads of a special rubberized fabric belting were used immediately over the coil springs. These pads were supplied by the Fabreeka Company.

In standard train equipment much of the noise is caused by the rattling of brake rigging, and the banging of journal boxes and bolsters against hardened steel chaffing plates. Rubber not only must stop vibrations arising from contact between the steel wheels and the rails but must also act to deaden noise arising from the truck structure itself. To this end journal and bolster chaffing plates in the Budd train were insulated by pads of rubber vulcanized and forming an integral sandwich. Brake rigging is not present in the full sense of the word by reason of a newly-developed eddy current braking device, with which the train is equipped, perfected by General Electric.



To be practical, rubber parts such as described above must be extremely durable, therefore age-resistant rubber was utilized. In no place on the Budd train is the rubber subjected to pressures exceeding 200 pounds per square inch. Rubber is amply protected against oil by the method of installation.

In addition to its use on the supporting trucks this stainless steel train also utilizes rubber in various other parts of the train. For instance, the sliding doors, electrically operated, are made of high tensile stainless steel, each door weighing 55 pounds. With high speed operation the momentum becomes a factor with respect to the jar of slamming or striking a person caught between the jamb and the door. The closing edge of the door, therefore, is faced with a soft rubber loop which is embedded in a cushion of rubber sponge. In this manner a hand or body caught between jamb and door suffers no injury.

Process for Slicing Sponge Rubber

A NEW PROCESS for slicing sponge rubber has been developed by M. C. Briggs, of Minneapolis, which permits slicing easily and quickly to an exceptional thinness, claimed by the developer, to be the thinnest slices yet achieved. The process consists of first introducing a solidifying agent into the pores of the rubber. This is accomplished by passing the rubber through rolls to squeeze out the air, the resulting vacuum sucking the solidifying agent into the pores.

The sheet of sponge rubber is then mounted on a special holding apparatus which clamps it tightly to run true through the cutting medium. The latter consists of a rotary knife revolving vertically at high speed. A plate against which the rubber passes is adjustable so that the thickness of the slice can be regulated instantly by a thumb screw.

After slicing, the solidifying agent is removed by immersion in water, leaving the sponge rubber sheets in their original condition prior to starting the procedure described. The primary factor in this process is the preparation of the rubber by solidifying so that it will form sufficient resistance to stand up firmly under the knife. Patents are pending on Mr. Briggs' process.

Lead-Covered Rubber Cables

DISCUSSING "Quality in Rubber Cable," before the Association of Mining Electrical Engineers, in London, recently, Mr. P. Dunsheath gave the details of an interesting test conducted to determine the advisability of using lead-covering material for rubber cables. The hardening and perishing of rubber in cables is due to oxidation. Oxygen and ozone produce this same effect on rubber compounds. Mr. Dunsheath's test proved that rubber insulation in a lead-covered rubber cable retains its original resilient properties for a longer period than does rubber in ordinary braided cable.

The test conducted was this: lengths of 3/.029 in v.i.r. cable, taped and braided, some lead-covered and some not, were subjected to a temperature of 180° Fahrenheit for a 12-month period. During this period samples were extracted for testing purposes. The results of these many tests showed very conclusively that the physical properties of the exposed cable had deteriorated to an excessive extent after only thirty days. The rubber in the lead-covered cable remained unchanged after 12 months. The obvious conclusions, drawn from these tests, is that if a rubber cable is to be worked under severe temperature conditions it should be lead-covered.

Roller Bearing Device is Cost Saver

IN AN effort to eliminate in large measure the ever-present breakdown problem faced by every rubber factory on their heavy machinery batteries a large rubber plant in Connecticut recently installed a pair of roller bearing pillow blocks in connection with its rubber-grinding mill drive. In addition to succeeding in holding breakdowns to a minimum the installation also proved a cost saver lowering power consumption charges fully 40 to 50% according to the Fafnir Bearing Company, New Britain, Conn., manufacturers of the pillow blocks installed.

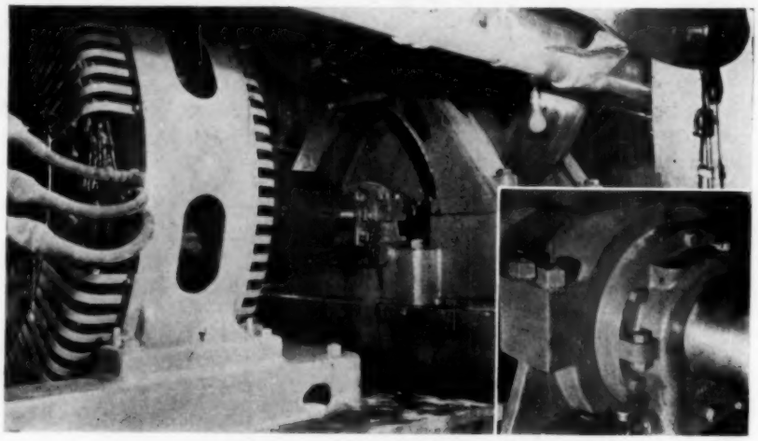
At the plant in question 700 horsepower is now transmitted through a direct-connected integral pinion shaft which in turn meshes with a large bull gear driving a battery of five 60-inch rubber grinding mills in addition to one No. 9 Banbury mixing machine. This horsepower requires 600 revolutions per minute with the roller bearing pillow blocks bearing the full strain of the pressure.

The grinding mills at this rubber factory convert raw rubber from the bale into thin sections with pressure from two rolls 22 inches in diameter. The usual procedure is then followed from rollers to mixers through warming mills to the thin sheets ready for use in the molding presses.

The bearings used in the application have a bore of 6 5/16 inches and involve a double cage assembly with twenty-four 1 1/16 inch diameter rollers in each, the overall width of the bearing itself being 6 inches.

A thorough lubrication system is employed in the roller bearing unit, an oil pump being provided for in the housing end cap with a breather which holds the oil at the proper level, only the lower half of the bearing thus being immersed in the oil. The lubricant can be maintained at the same level for most satisfactory operation by periodic inspections and occasional renewals. The life of both pinion and gear, in consequence of perfect meshing of gear teeth maintained by the roller bearing, are greatly increased.

The mechanical department of the rubber plant also advised the manufacturers of the roller bearing device that the synchronous motor driving the pinion shaft is sometimes overloaded to as much as 1,200 horsepower although its rated power out-put is but 700 H.P.



Rubber Grinding Mill Drive
Close-up Shows Large Roller Bearing Pillow Block Application

Rubber Cement Surfacing

TWO large bronze plaques, intended for use at the entrance to the grounds of the National Bureau of Standards, in Washington, D. C., were recently cast in the experimental foundry of that bureau. These plaques carry the Department of Commerce seal and the inscription—National Bureau of Standards—in raised letters on a matte background.

Due to slight washing of the sand, and other causes, the plaques were found unsatisfactory. C. M. Saeger, Jr., chief of the foundry, overcame the difficulty by spraying rubber cement over the mold surface. Firm adhesion of the fine surface particles was secured by this treatment, accurate details of the plaque face being assured. This procedure also permitted the castings of the metal in green sand mold.

The final result, reported by Mr. Saeger, was that economy in handling of molds as well as in producing castings of an excellent quality is obtainable by the use of rubber cement surfacing.

New Sponge Rubber Process

PREPARATION of sponge rubber by the employment of carbon dioxide gas under high pressure is a new development recently assigned to the Liquid Carbonic Corporation, Chicago, Ill., by Henry R. Minor, its inventor. By the process (U.S.P. 1,964,739), a mass of rubber compounded for vulcanization is subjected to carbon dioxide at cylinder pressures of approximately 850 pounds. In the absence of heat this mass is permitted to remain in the gas until absorption of the gas by the rubber occurs. The pressure is then released at a substantially uniform rate and over an interval of time. This permits the rubber mass to expand, and it is then cured under conditions which set up the rubber quickly.

The same company has also acquired a process developed by Mr. Minor for the manufacture of a cellular heat insulating material (U.S.P. 1,964,740). A mass of rubber is compounded for vulcanization to produce a hard rubber with an accelerator which will cause the rubber to set promptly upon the application of heat. This body of rubber is subjected to the action of carbon dioxide gas at relatively low pressure for a sufficient period to obtain penetration of the gas throughout the rubber mass. On releasing the pressure, the rubber is permitted to expand under the influence of the entrapped gas. The mass is then vulcanized to a hard rubber.

De-Polymerization of Rubber

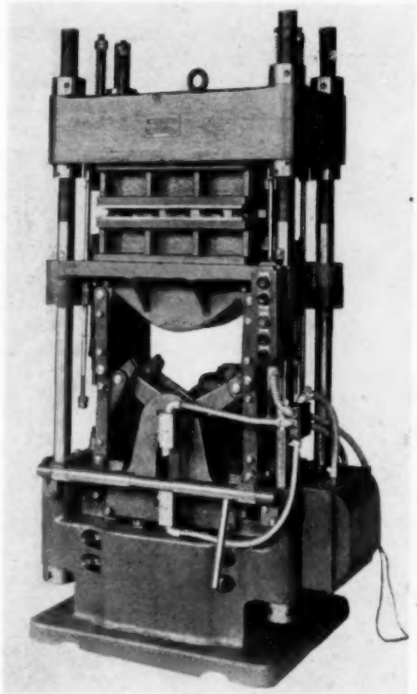
RUBBER can be de-polymerized to give 40 to 60 per cent solutions by treatment in suspension o rsolution with 10 per cent of its weight of 53 per cent nitric acid, according to an extract from the *Chemical Trade Journal*, London. A paste is first prepared by stirring 10 kilograms rubber in 90 kilograms benzole, whereupon 1 kilogram of the 53 per cent nitric acid is stirred in and the de-polymerization interrupted at the desired stage by neutralization with ½ kilogram barium carbonate.

The de-polymerized rubber solution is decanted off and concentrated if necessary by evaporation. Coatings of this form of rubber are somewhat tacky but this defect can be remedied by a partial re-polymerization (immediately after the neutralization stage) with antimony trichloride or phthalic acid in alcoholic solution. This process is covered by a recently issued patent *i. e.*, German Patent No. 599,405.

New Equipment

New Mechanical Molding Press

A NEW STYLE self-contained, motor-driven, mechanical molding press of 100 ton capacity, has been introduced by The Standard Machinery Company, Mystic, Conn. It has a platen area to accommodate automatic molds 22 inches wide by 12 inches front to back. The press is 90 inches high to the top of the ejector rods. The platen has a rise and fall of 6 inches. It is equipped with both upper and lower ejector systems, each of



which have an ejector movement of 2 inches. The weight of the press is approximately 8,000 pounds.

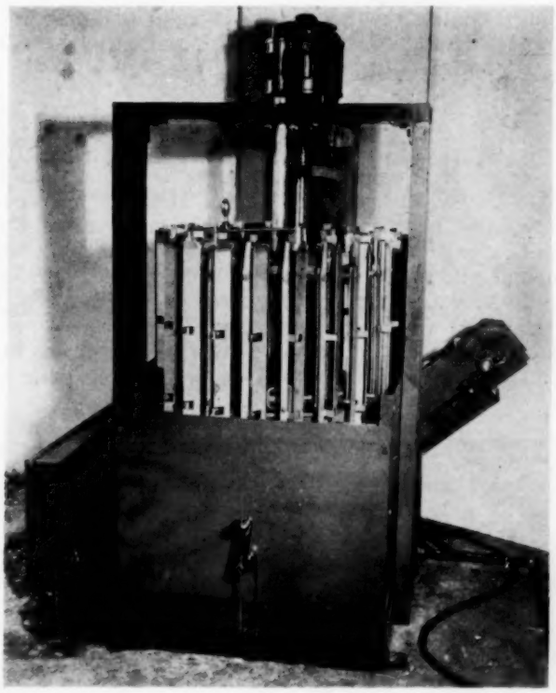
The entire power transmission mechanism, including the motor, is mounted on four heavy springs. When the press is started by means of double push button system, the platen rises until the pressure on the molds reaches a predetermined pressure, which compresses the springs a certain amount, causing the motor to shut off. As the material begins to flow into the mold the springs again expand, causing the toggles to straighten and at the same time starting up the motor, which will again compress the springs at a predetermined pressure and again shutting off the motor. This movement gives the follow up movement required for the molding of plastic compounds and can be repeated a sufficient number of times to insure the complete transition of the material and pressing it home into the mold.

As the toggle members become straighter at each successive movement the pressure is increased, until the time the mold is ready to close, the toggles are at their straightest point and the maximum pressure is obtained. When once this maximum pressure is obtained it can be held for any required length of time without any consumption of power. The only time that power is consumed is when the motor is running.

The motor is controlled by means of a push button station, having two start buttons, one inching button, one stop button and one reverse button. Thus the movement of the press can be controlled at all times by the operator and by means of a time relay can be made full automatic with any variation on the dwell, within reason, to allow for curing. In other words the operator, when the press is loaded, pushes the two start buttons, the relay is set for the right time of cure and no further attention on the part of the operator is required until the press opens automatically and stops at the completion of the cycle.

Turret Cutter for Extruded Stocks

A NEW STYLE turret cutter for extruded stocks is being featured by the Utility Manufacturing Company, Cudahy, Wisconsin. The outstanding points of the new cutter are said to include the accuracy of cut which saves pre-weighing and reduces the overflow, reloading of the machine without stopping and a feature which enables length adjustment to be made while the machine is in operation. Other features of the new type turret cutter are: the turret speed can be changed to suit the stock being cut, the knife is sharpened while the blade is running, it can take most any shape stock in lengths 30 to 36 inches long and the base forms a pan to catch all the



drippings. The strongly-built machine weighs approximately 4,000 pounds. The motor power is ample for all sizes and speeds required. A conveyor is attached to the machine to take the cut pieces away, discharging them into a tote box. The measuring, locking, cutting and release, on the new Utility Turret Cutter, are all automatic in operation.

Giant Tube Mold Perfected

THE largest tube mold ever built in this country for curing inner tubes in an individual tube press has been constructed by the National Rubber Machinery Company, Akron. The mold in question was built for

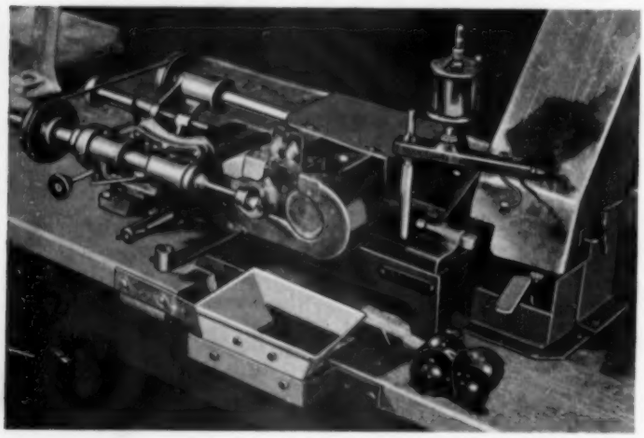
curing 11.25/42 inner tubes. This size of tire is used on a special farm tractor, such as used on tobacco plantations, and is designed for wheels that will carry the tractor chassis high enough not to cause any damage to the young plants under cultivation.

The cross section of this giant-size tire is 11¼ inches and

the rim diameter 42 inches. Actual cavity of the mold is a 9⅜ inch circular cross-section with a 60¾ inch outside diameter and a 42 inch inside diameter. Completely machined, the bare mold weighs 4150 pounds. The mold was built for use on the No. 4 National diaphragm type tube press, several of which are in operation in the Akron plants of both Firestone and Goodyear.

Circular Goods Trimming Machine

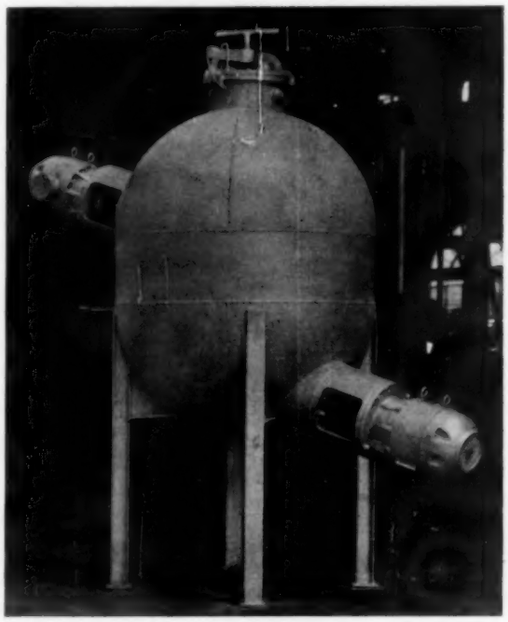
AN IMPROVED TRIMMING MACHINE, for all types of circular rubber goods, has been introduced by the Bridgwater Machine Company, Akron. The device is noted for its speed in trimming such circular articles as balls, discs, rings, etc. Production of 2,000 pieces per hour is said to have been accomplished. It will accommodate articles ranging from ½ to 10 inches in diameter. These trimming machines are supplied either with indi-



vidual motor drives or with tight and loose pulleys for factory power. Changing of the articles being trimmed requires only the interchange of the necessary taper shank arbors and the adjustment of the machine head. Interchanging takes but a few minutes. It is manufactured under license from the B. F. Goodrich Company, the latter having used the machine for several years for trimming purposes.

New Rubber Cement Mixer

DESIGNED TO ELIMINATE evaporation losses, decrease operating costs, minimize fire hazard and improve the quality of the finished product, the "Swift-Working" Rubber Cement Mixer has been placed on the market by the Struthers-Wells Company, Warren, Penna. It is vapor tight during operation with provisions made for charging the solvent and discharging the cement which makes the mix entirely closed from the atmosphere with the exception of a short period during which the rubber is charged. Agitators on the new mixer are similar to the marine screw propellers, which give a violent whirling motion and a severe chopping action. The rubber is kept in complete suspension and repeatedly subjected to the agitating and cutting action of these devices. This type of agitation, it is claimed by the manufacturers, not only speeds up the solution of rubber into the solvent, but also in keeping the rubber in suspension dissolves all of the charge. In addition to being vapor tight the mixer is



designed to withstand a pressure sufficient to smother combustion within the tank. A full floating jacket is provided to control the temperature of the mix. Other features incorporated in the "Swift-Working" mixer include a quick-opening manhole cover, large outlet at the bottom of the hemisphere for complete drainage, thermometer well, sight glasses in the manhole cover and an inner surface of the mixer smooth and free from obstructions tending toward simple operation and easy cleaning.

Uniform Flow-Scale Meter

DEVELOPED in response to a demand for a meter with a wide, readable flow range the Foxboro Company, Foxboro, Massachusetts, recently introduced a Uniform Flow-Scale Meter which records temperatures and pressures on the same chart with the flow. All pens on the new meter move about the same center of rotation and do not interfere with each other at any point in their travels over the face of the meter. It records flow, temperature, pressure of steam, water, air, oil and gas solutions.

REVIEW SHELF

• Monthly Review of New Books, Pamphlets, Company Catalogs, Service Bulletins, House Organs, etc., Pertinent to the Industry.

THE VANDERBILT NEWS. Vol. 4, No. 5. Published by R. T. Vanderbilt Company, 230 Park Avenue, New York City. 1934. 36 pp.

This issue is devoted in entirety to the subject of latex and contains a vast amount of original material on the use of latex as well as considerable basic information on the preparation of mixes, dispersions, etc. The use of Darvan as a dispersing material in latex compounding and the new accelerator for latex, Butyl Zimate, are fully described and supplemented with charts based on the results of numerous tests. The articles in this issue are undoubtedly an outstanding contribution to the advancement of applications of latex.

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THE FIFTIETH YEAR. Issued by the Harnischfeger Corporation, Milwaukee, Wisconsin. 1934. 84 pp.

To commemorate the fiftieth anniversary of the Harnischfeger Corporation, manufacturers of conveying equipment, excavators, cranes, and similar equipment, this attractive booklet, with gold ink profusely used, was issued. It completely describes the early history of the concern, the personnel, the products, etc.

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HANCOCK INSPIRATORS. HANCOCK BRONZE VALVE. HANCOCK FORGED STEEL VALVE. Issued by the Consolidated Ashcroft Hancock Company, Inc., Bridgeport, Conn. August, 1934.

These three booklets, respectively termed Catalog 100, 4000, and 7000, completely and fully describe the line of jet apparatus featured by the Bridgeport concern. The first named catalog is replete with descriptions and illustrations of the inspirators, ejectors and injectors manufactured, together with specifications, applications and instructions for installation and operation. The second catalog is devoted to the line of bronze valves made with full information. Catalog 7000 describes and discusses the forged steel valves produced by the company.

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FILTRATION AND FILTERS FOR INDUSTRIAL USE. Issued by the Filtration Equipment Corporation, 350 Madison Avenue, New York City. September, 1934. 8 pp.

This attractive booklet has been printed in such manner that it readily fits the engineer's equipment file. As the title indicates the booklet discusses, describes and illustrates various types of filter equipment used for industrial purposes including rotary vacuum filters, open tank leaf filters, tank equipment, etc. Of particular interest to the rubber field is the first type mentioned which is a filter used in rubber reclaiming. This device is used for dewatering purposes primarily.

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THE FALLACY OF HIGHER WAGE RATES. By Allen W. Rucker in collaboration with N. W. Pickering. Distributed by Farrel-Birmingham Company, Inc., Ansonia, Conn. 1934. 16 pp.

This booklet is the eighth of a series written by the co-authors. It presents a study of the relationship of wages to productivity. The entire series is aimed at proving that modern machinery is a major factor in the recovery movement.

MECHANICAL
MOLDED RUBBER GOODS
We Solicit Your Inquiries
THE BARR RUBBER PRODUCTS COMPANY
SANDUSKY, OHIO

SOUTHERN ALKALI. Distributed by the Southern Alkali Corporation, Corpus Christi, Texas. 1934. 16 pp.

Three years ago preparations were made for the production of alkali in the South. This interesting booklet describes the early efforts and endeavors to furnish Southern manufacturers with this product. It also describes the plant of the Southern Alkali Corporation which has recently been completed and is now in operation. The various alkalis produced by the company, including Soda Ash, Caustic Soda, Caustic Ash, etc. are described in the booklet together with their physical properties and use. Packing is also described.

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FALK MOTOREDUCERS. Bulletin No. 272. Issued by the Falk Corporation, Milwaukee, Wisconsin. 1934. 36 pp.

Many installations permit the combining of motor and speed reducer in a single unit. Such a unit is the "Motoreducer," product of the Falk Corporation, the advantages of which are fully described and illustrated in this booklet. Specifications, advantages, and installation notes of the several type combination units featured by the concern occupy the major portion of the catalog which also devotes several pages to the use of Falk Couplings. Typical installations of "Motoreducers" are illustrated.

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ANNUAL REPORT (1933) OF THE RUBBER RESEARCH INSTITUTE OF MALAYA. Published by the Institute, Kuala Lumpur, F. M. S. July, 1934. 163 pp. $1.00.

The year 1933 was the seventh complete one of the Institute's activities. A full report of the activities of all committees and branches is made. These are of particular interest to rubber manufacturers who operate their own plantations. Results of varied investigations carried out under the Institute's supervision are given. Chemical investigations included those on latex constituents, latex preservation and concentration, coagulants of latex, clone rubber and latex, etc. Much space is devoted to surveys made to eliminate pests and plant disease with control measures listed. A general review of the year's activity is also included in the report.

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PRACTICAL EVERYDAY CHEMISTRY. Edited by H. Bennett. Published by The Chemical Publishing Company, 1450 Broadway, New York City. 305 pp. $2.00.

Eliminating theory this manual contains practical working formulae for making hundreds of products ranging from adhesives to whiskey. It steers clear of technical complexities and is aimed at satisfying the layman's curiosity as to the ingredients which serve in manufacturing the products he uses daily as a matter of course. A chapter is devoted to rubber, plastics and waxes.

Editorial Comment

Better Quarters for Rubber Division Meetings

CONSIDERABLE unfavorable comment was heard among many members of the Rubber Division at the American Chemical Society meeting held in Cleveland last month on the totally inadequate quarters furnished the Division for its technical sessions. This criticism was well founded for the meeting room, located in some hastily improvised space in the Higbee Building (the original space provided for, the Higbee Auditorium, was not available) was ill-ventilated, noisy, uncomfortable and entirely unsuited in almost every way for the proper presentation of technical papers.

With the largest attendance of the Rubber Division in recent years it is extremely unfortunate that the meeting room was undoubtedly the poorest ever provided in the estimation of many who have attended practically every divisional meeting since its organization. After much pressure was brought, and complaints made, the sessions were finally removed to the dining room of the Cleveland Chamber of Commerce.

We believe the growth of the Rubber Division to one of the largest, if not actually the largest, in the American Chemical Society, entitles its members to a little extra consideration on the part of the executives of the Society in charge of arrangements at every annual and semi-annual meeting. It is by no means pleasant to sit through a technical session in hot weather under the best of conditions and it is to the credit of the members of the Rubber Division that such a large number patiently sat through the recent sessions. The excellence of the papers presented at these sessions accounted for the forbearance and perseverance shown by the attending members.

It is to be hoped that the Rubber Division will not be forced at any future meeting to put up with conditions which resemble in any respect those which existed in Cleveland last month. With the faults exposed the correction should be simple.

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Business Holding Up

FIGURES RELEASED last month by the Rubber Manufacturers Association, given in detail in the following news pages, pertaining to rubber consumption in the United States upset several predictions and indicate an improved position in the rubber manufacturing field. Practically every estimate we saw for consumption for the month of August was below 30,000 tons. The average estimate was about 28,000 tons. Actual consumption, according to the RMA was 33,310 tons for the month. This is the first time in years that consumption during August was larger than July, which was 32,646 tons.

Another encouraging note was sounded by the figures. Manufacturers inventory of pneumatic casings declined in July by 759,068, while tubes were down 719,746. Shipments of both tires and tubes were substantially above production, which was normal.

All of the above are healthy signs. While there is no great sign that the rubber manufacturing industry has come back to its own, or is even approaching production figures recorded four and five years ago, yet these current figures indicate a definite trend toward normal production.

The automobile business was expected to require a stimulant during the late summer months. But something happened this year. Sales in August and early September were keeping pace with June and July. Likewise the rubber manufacturing industry. While some claim it is a mere phenomena, an uncalled for spurt, we hope that it is a positive sign toward real recovery . . . and figures don't lie!

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Restriction and Competition

ONE OF THE ANGLES in the current restriction scheme (which is steadily overcoming minor obstacles which beset its path) not to be overlooked is the fact that it will affect competition between rubber manufacturers. According to an analysis of the situation made by the Department of Commerce a point of some importance in connection with the international rubber-restriction scheme is its incidence on the competitive strength of the various rubber-manufacturing companies.

This point is now of greater consequence than in the period of the British (Stevenson) restriction scheme, because more manufacturers have become also rubber producers—the leading French, British, and Italian manufacturers, as well as three of the largest American companies, being engaged in the rubber-plantation industry on a large scale. These companies are expected to have an advantage over all other manufacturers in costs of rubber, its amount depending on the difference between their respective costs of production and the market price for that percentage of their requirements produced on their own plantations.

In any event the edge gained by such rubber manufacturers will not be sufficient to seriously affect competition unless rubber prices soar to unexpected levels. If the price of rubber reaches and remains around a 20 to 25 cents per pound figure, as expected, the actual advantage can almost be discounted.

CURRENT • NEWS
of the Rubber Industry

OCTOBER, 1934

More Than 300 Members of Rubber Division Attend Sessions at Meeting Held at Cleveland

Semi-Annual Dinner Is Huge Success—Technical Sessions, Under Difficult Conditions, Unusually Interesting—New Officers Elected for 1934-35

THE MEETING OF THE RUBBER DIVISION, held on September 12 and 13 in Cleveland, in conjunction with the 88th meeting of the American Chemical Society was attended by the largest number since the Detroit conclave several years ago. More than 300 were on hand for the technical sessions while an additional 100 came on from Akron and vicinity for the semi-annual dinner. The large attendance was attributed to the central location of Cleveland and to the improvement in the financial status of rubber companies which permitted more of their technical staffs to make the trip than in recent years.

Rubber Division headquarters were maintained in the Hotel Cleveland. The technical sessions, however, were held in the Higbee building adjoining the new Union Terminal on the first day, September 12, and in the dining room of the Cleveland Chamber of Commerce in the Terminal Tower Building on the following morning.

The change in meeting quarters was due to the many complaints registered by attending members because of the heat, lack of ventilation, and general uncomfortableness of the space alloted in the Higbee Building. Thanks are due to the officers of the Rubber Division for securing the change and to the officers of the Cleveland Chamber of Commerce for their willingness in permitting the use of their commodious quarters for the final session of the meeting.

Fourteen papers were presented at the technical sessions. (Abstracts of these papers appeared in the August, 1934, issue of THE RUBBER AGE.) The titles, authors and their company connections follow:

Forms of Rubber as Indicated by Temperature-Volume Relationship. Norman Bekkedahl, Bureau of Standards.

Heats of Combustion of Rubber and of Rubber Sulfur Compounds. R. S. Jessup and A. D. Cummings, Bureau of Standards.

Studies in the Vulcanization of Rubber. VI. Thermochemistry. John T. Blake, Simplex Wire & Cable Company.

Thermal Properties of Rubber Compounds. II. The Effect of Pigmentation on the Heat Generation of Rubber Compounds. C. E. Barnett and W. C. Mathews, New Jersey Zinc Company.

A New Laboratory Machine for Evaluating Breakdown Characteristics of Rubber Compounds. R. S. Havenhill and W. B. MacBride, St. Joseph Lead Company.

The Surface Energy Relations between Pigment Materials and Rubber. Harlan A. Depew and M. K. Easley, American Zinc Sales Company.

Dispersion of Channel Gas Black in Rubber. Effect of Stearic Acid and Other So-Called Dispersion Agents. C. R. Park and V. N. Morris, Firestone Tire & Rubber Company.

Natural and Synthetic Rubber. XV. Oxygen in Rubber. Thomas Midgley, Jr., A. F. Shepard and Mary W. Renoll, of the Midgley Foundation and A. L. Henne, Ohio State University.

Some Relations Between the Tear Resistance and the Structure of Rubber. W. P. Busse, B. F. Goodrich Company.

A Method for Measuring the Pressure in a Rubber Extruding Machine. J. H. Dillon and P. M. Torrance, Firestone Tire & Rubber Company.

The Effect of Manganese Salts on Vulcanized Rubber. George A. Sackett, Goodyear Tire & Rubber Company.

Value of Anti-Oxidants in Counteracting the Detrimental Effects of Copper-Contaminated Rubber. C. S. Powell and J. N. Street, Firestone Tire & Rubber Company.

Colloidal Changes during Vulcanization of Rubber. Ira Williams, E. I. du Pont de Nemours & Company.

Higher Alcohols in Rubber Compounding. II. Glycerol. W. B. Wiegand, Binney & Smith Company.

RUBBER DIVISION OFFICERS 1934-1935

Chairman ..... S. M. Cadwell
Vice-Chairman ..... H. E. Simmons
Secretary-Treasurer C. W. Christensen
Sergeant-at-Arms ..... L. W. Brock

EXECUTIVE COMMITTEE

Ira Williams — A. A. Somerville
G. Hinshaw — John N. Street
H. Conroy

Elect Officers

Following the last technical session new officers for the 1934-1935 season were elected. The new chairman is S. M. Cadwell (U. S. Rubber Co.); vice-chairman, H. E. Simmons (Akron University); secretary-treasurer, C. W. Christensen (Rubber Service Laboratories Co.); and sergeant-at-arms, Lester W. Brock (C. P. Hall Co.).

The new executive committee consists of Ira Williams (du Pont), A. A. Somerville (Vanderbilt), G. Hinshaw (Goodyear), J. N. Street (Firestone) and H. Conroy (General).

"Hez" Simmons, the retiring secretary-treasurer, which position he held for many years, found it necessary to give up those duties due to press of matters at Akron University of which he is president. His election as vice-chairman was a mark of appreciation for his valued efforts on behalf of the division.

A membership of 357, with 95 associate

Left: S. M. Cadwell, United States Rubber Company, the new chairman of the Rubber Division, A.C.S. Right: H. E. "Hez" Simmons, president, Akron University, elected vice-chairman for the 1935 season.

members, was revealed by the secretary's report. Only 32 members have not yet paid their dues for the current year. Four new members have been added to the roster. In addition to those receiving copies of "Rubber Chemistry and Technology," as members, 104 others have subscribed.

The financial report showed a total income of $3,178.34 since the report made at St. Petersburg. Plus the previous balance on hand this made a total of $6,198.78. Expenses were $4,388.28 leaving a balance of $1,810.50. Frozen assets in banks in liquidation were $2,436.05 which with $198.55 due for July advertising in the official publication brought the total assets to $4,445.10. Of the total amount listed as expenses $4,158.52 was charged to publication of the Division's journal and the balance to maintenance of the records and secretarial costs.

Immediately after the business session was concluded the executive committee held a meeting and discussed the possibilities of publishing the A.C.S. Monograph on Rubber. No decision was reached as to a publication date.

On Wednesday night, September 12, the Division held its semi-annual banquet in the Rainbow Room of the Hotel Carter. More than 400 persons attended. It was a gala affair with every angle given keen attention to make the occasion a complete success. In addition to an excellent meal and fine entertainment, several leading suppliers distributed dozens of appreciated prizes.

The entertainment program featured the WTAM Broadcasting Orchestra, the Bebe Beri Girls, Mary Lenkue, and Carabell Johnson, in addition to other acts added at the last minute. Entertainment ran from dancers to vocalists.

Several valuable table favors were donated in addition to a large number of gifts which were drawn for with lucky numbers. The articles awarded included hand bags, electric clocks, bridge table and chairs, brief cases, canes, book-ends, flashlights, and others too numerous to mention. Thanks are due to the following companies for the gifts which were contributed:

Akron Chemical Co., Anaconda Zinc Oxide Co., American Zinc Oxide Co., Binney & Smith Co., Godfrey L. Cabot Co., Columbia Chemical Co., Dow Chemical Co., E. I. du Pont de Nemours & Co., Farrel-Birmingham Co., Georgia Kaolin Co., General Atlas Carbon Co., C. P. Hall Co., J. M. Huber, Inc., Imperial Color Co., Naugatuck Chemical Co., New Jersey Zinc Co., THE RUBBER AGE, Rubber Service Laboratories Co., Stauffer Chemical Co., Superior Zinc Co., United Carbon Co., R. T. Vanderbilt Co., C. K. Williams Co., Wishnick-Tumpeer, Inc., and Xylos Rubber Company.

That both the evening and program was one of the best yet prepared for a Rubber Division dinner was generally agreed upon. Credit for its huge success goes to the committee in charge which consisted of V. L. Smithers, chairman and these members: H. P. Protheroe (Goodyear), E. H. Baker (Binney & Smith), John N. Street (Firestone), Bert S. Taylor (Goodrich).

On Friday, following the two-day session, special busses carried some 150 members of the Rubber Section to Akron where they were feted at a luncheon at the University Club tendered by the Akron Section, American Chemical Society. Following the luncheon the members were taken on trips through various rubber factories in that city.

The next meeting of the Rubber Division, to be held in the spring of 1935, will be in New York City.

Galoshes on Trial!

A pair of rubber galoshes were put on trial in Moscow, in the Soviet Union, on October 3. The trial was held at the Red Hero rubber factory. Specific accusations charged the possibility of inferior quality. This is the first of a series of trials before a court consisting of industrial managers, engineers and trade representatives during which products manufactured in the U.S.S.R. will be thoroughly scrutinized for imperfections. Anybody can bring an indictment and the public is being urged to send complaints on any household item that merits attention.

RUBBER PROOFERS GROUP IS FORMED IN ENGLAND

An organization has been formed in London, England, known as the Rubber Proofers' Association. The main functions of this new association is to fix minimum prices for all classes of rubber proofing, to supervise conditions of sales and terms of guarantees, and to administer a pool and quota system which is an integral part of the entire scheme.

According to reports from England the association already has attained a membership which includes 90 per cent of the firms in the trade. Most of the leading Manchester proofers have joined the group, and many of the Scottish proofing companies have also joined the movement. The first step to improve conditions has already been taken. All prices for guaranteed and non-guaranteed proofing have already been slightly raised. A further upward revision in prices is planned for January 1, 1935.

Experts state that the inclusion of a pool and quota scheme is proof that there can be no regulation of prices unless there is also a regulation of production. Each member of the association supplies it with particulars of their plants the average of which determines the standard quota. Each member also supplies a special accountant who reports on the yardage of proofed cloth invoiced at each plant. If any member sells less than his quota he is reimbursed by the Association, if he sells more than his quota he makes an additional payment to it.

To meet all expenses, the Rubber Proofers' Association proposes to levy each member £1 per machine. Penalties are provided for in cases where members sell below the fixed prices.

Start Tire Dealer Survey

The Leather-Rubber-Shoe Division, Department of Commerce, Washington, D. C., has started its planned survey of dealer stocks of tires as of October 1. A similar survey was made on April 1. Because of the unusual price situation which has reigned in the domestic market during recent months and the gradual tightening of restrictive regulations on crude rubber production, the Department advises that it is particularly anxious to obtain as accurate a result as possible in the current survey. Questionnaires are being mailed to all dealers who are urged to make a complete and prompt report to the Department of Commerce.

CONSUMPTION IN AUGUST HIGHER THAN IN JULY

Consumption of crude rubber by manufacturers in the United States for the month of August amounted to 33,310 long tons, which compares with 32,647 long tons for July. August consumption shows an increase of 2.0% above July, but was 25.0% below August a year ago, according to statistics released by The Rubber Manufacturers Association. Consumption for August (1933) was reported to be 44,428 (revised) long tons.

Imports of crude rubber for August were 33,248 long tons, a decrease of 19.9% under July figure of 41,530 long tons and 25.8% below 44,802 long tons imported in August, 1933.

Total domestic stocks of crude rubber on hand August 31st were 362,647 long tons, which compares with July 31st stocks of 364,883 long tons. August 31st stocks show a decrease of less than 1% below July 31st stocks, but were 10.7% above stocks of August 31, 1933.

The participants in the statistical compilation report 40,278 long tons of crude rubber afloat for the United States ports on August 31st, compared with 45,869 long tons afloat on July 31st, this year, and 53,084 long tons afloat on August 31, 1933.

August reclaimed rubber consumption is estimated to be 8,493 long tons; production, 8,160 long tons; stocks on hand August 31st, 24,607 long tons.

JULY TIRE SHIPMENTS 20% LOWER THAN JUNE

Shipments of pneumatic casings for the month of July amounted to 4,157,411 casings, a decrease of 20.5% below June, this year, and 24.4% below July (1933), according to statistics released by The Rubber Manufacturers Association, Inc. Production of pneumatic casings for July was 3,352,836 casings, a decrease of 22.8% under June and 41.3% below July, 1933.

Pneumatic casings in the hands of manufacturers July 31st amounted to 9,436,816 units, a decrease of 7.7% below June 30, 1934, but were 37.9% above stocks July 31, 1933.

The actual figures are as follows:

PNEUMATIC CASINGS

	Shipments	*Production*	*Inventory*
July, 1934	4,157,411	3,352,836	9,436,816
June, 1934	5,228,251	4,342,170	10,219,360
July, 1933	5,497,191	5,713,626	6,844,006

Pioneer Rubber Expanding

J. C. Gibson, president, Pioneer Rubber Company, operating plants in Willard and Attica, Ohio, advises that the plant at Attica has substantially increased its business in the manufacture of surgeon's rubber gloves. Payrolls have reached the highest totals in the current year, with both plants busier than they have been for many months.

To Exhibit Rubber Products

The American Hard Rubber Company, New York City, manufacturers of hard rubber products, will exhibit its "Ace" line at the Second Annual Industrial Materials Exhibit to be held at the Park Central Hotel in New York the week of October 15 to 19. On the program for the week is included motion pictures, lectures and general entertainment.

RUBBER MANUFACTURERS NOW BATTLING UNIONS

Rubber manufacturers, particularly in the Akron area, are up in arms against the encroachment of labor unions in their individual affairs. The United Rubber Workers union, which is an affiliate of the American Federation of Labor, recently demanded the right to have every rubber factory conduct a vote, under government supervision, to determine whether the union or the so-termed company unions will represent the workers at the various factories.

The Regional Labor Board at Cleveland, of which Ralph A. Lind is director, held a hearing on September 26 to determine whether a government-supervised employes' election shall be held at each plant. Tire manufacturers vigorously protested the holding of this hearing on the grounds that it was "unlawful" and that it "interferes unduly and illegally" with each company's business.

John W. Thomas, president of Firestone Tire & Rubber Company, argued that "there is no occasion for such election" since he claimed that no controversy exists between Firestone and its employes with reference to wages, hours, working conditions or representation.

Several months ago the union attempted to force the Rubber Manufacturers Association to deal with it collectively for labor contracts, but were forcefully turned down by A. L. Viles, president and general manager of the Association. Last month it tried again after being rebuffed by the Firestone and Goodrich companies, but was again refused on the grounds that the Association was not set up for collective bargaining for the entire industry. The union is pinning its hopes on the eventual outcome of the recent hearings conducted by Mr. Lind.

CREDIT GROUP FORMED BY FABRIC RUBBERIZERS

Several members of the rubberizing industry, selling to the raincoat and sportswear trades, have formed an organization known as the Proofers' Credit Group. The purpose of the recently organized group is to reduce credit losses through periodical clearances and round-table discussions. Another purpose for its formation is to encourage cooperation within the industry and to discuss credit problems in general.

The National Credit Office has already been retained by the Proofers' Credit Group to make clearances and to edit financial reports. John O. Webb, of the National Credit concern, which maintains executive offices at 2 Park Avenue, New York City, is in charge of this work.

One of the first moves made by the group was to elect officers for the 1934-1935 season. Officers elected are: Walter R. Carlson, Plymouth Rubber Company, president; and J. A. Hudson, Arrow Products Company, secretary-treasurer. The next meeting of the group has been set for October 22. It will be held at the Chamber of Commerce Building, Boston, Mass.

CANADIAN JULY EXPORTS SHOW CONTINUED GAIN

Both production and exports of rubber products produced in Canada during July showed a continuation of the expansion recorded for the last twelve months, according to an announcement from the Department of Commerce. With few important exceptions the Canadian rubber industry is dominated and controlled by leading United States rubber manufacturers.

Exports during the month of July showed a gain of 8 per cent over June, representing a monetary value of $1,112,072. Exports for the twelve-month period ending July 31 totaled $10,659,040, which is equivalent to a 60 per cent increase over the preceding twelve-month period.

July tire exports totaled $618,895, which was $70,000 in excess of the June value. Shipments of pneumatic casings for the 12 months ending July 31, 1934, were valued at $5,253,058, almost twice as much as that recorded for the preceding like period, which was $2,903,164.

May Purchase Plantation

The Goodyear Tire & Rubber Company, Akron, may soon purchase, or secure a concession on, a huge rubber plantation in Panama, according to report. J. J. Blandin, manager of the company's crude rubber department, was a recent visitor to Panama looking over various fields. Goodyear officials, however, have so far denied that any negotiations have been conducted toward purchase. The company buys most of its crude rubber supply on the open market, although it operates two small plantations in Sumatra and the Philippines.

VICTOR RUBBER ASSETS TO BE SOLD AT AUCTION

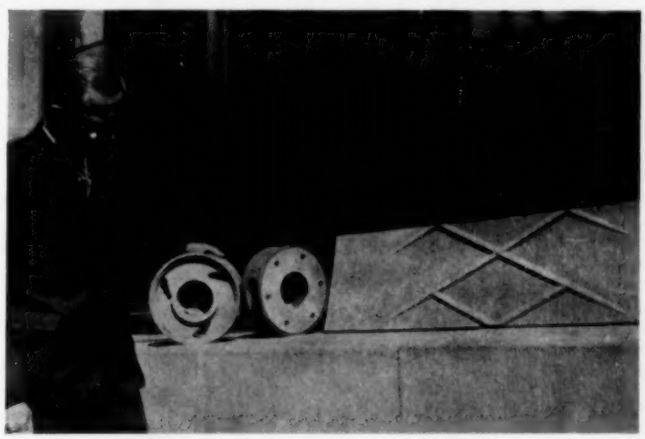
An entry was signed on September 15 by Judge Golden C. Davis in the Clark County Common Pleas court authorizing Laverne C. Sturgis, receiver for the Victor Rubber Company, Springfield, Ohio, to sell the property and assets of that defunct concern at a private auction. The best prices obtainable will be accepted by the receiver.

The entry also authorized the rejection of previous submitted bids on the real estate, machinery and buildings of the Victor company received during a public sale held the preceding week at the site of the plant near Maitland, Ohio.

Urges Five-Day Week

Harvey S. Firestone, Sr., chairman of the board, Firestone Tire & Rubber Company, Akron, while attending the annual convention of the Miami Committee of 100, at Rochester, N. Y., last month, urged manufacturers to permanently adopt the five-day work week since "it is here to stay for all industries." Mr. Firestone revealed that the five-day week is to become permanent in all of his own company's plants. In discussing strikes, he said that while they are indicative of returning prosperity, they do not hasten its return.

RUBBER MANUFACTURERS EXHIBIT AT EXPOSITION



Sand pump rubber parts and section of ribbed center belt

Several manufacturers exhibited interesting applications of rubber at the exposition held in conjunction with the annual meeting of the Western Division, American Mining Congress, held in San Francisco, the week of September 24 to 29. The rubber companies included the American Rubber Manufacturing Company, and the Garlock Packing Company.

One of the more interesting exhibits was displayed by the American Rubber concern, which maintains headquarters in Oakland, California, i.e. a conveyor belt with ribbed center and another with raised center. These belts are intended for conveying wet, slimy materials.

The ribs on the belt are molded on the cover and regardless of degree of incline the load cannot move once set between the ribs. Ribbed center belts were originated back in 1907 by the company. The raised center belt gives greater thickness of cover where greatest wear and loading takes place and acts as a resilient cushion when the load is dropped onto it.

Hydroseal sand pumps, product of the Allen-Sherman-Hoff Company, were on view. These pumps utilize protective Maximix parts including rubber propeller and rubber shell liner. These rubber parts prevent the abrasive material being pumped from touching any metal part of the pump, thus preserving its life. The impeller and entire pump casing are molded of Maximix rubber, the metal shell merely holding the rubber casing in place.

The Mine Safety Appliance Company demonstrated their latest safety device termed the Comfo Respirator. It is constructed with a light rubber face piece which may be washed and disinfected at any time without corroding the filter cases of aluminum.

E. A. Hoff, district manager, Garlock Packing Company, Palmyra, New York, was in charge of that company's display of its extensive line of rubber packings and molded rubber products.

ANOTHER OUTING HELD BY RHODE ISLAND CLUB

The recently-formed Rhode Island Rubber Club held another of its combined outing-meetings on September 20 at the Warwick Country Club, Warwick, Rhode Island. Approximately 80 members and guests were present to participate in the games and business session. Various sporting events, including golf, tennis, baseball, swimming, horseshoe pitching, etc. were indulged in during the afternoon. Although no prizes were distributed this in no way detracted from the enjoyment. Following these events a real, old-fashioned Dutch Dinner was served and is said to have been well relished.

In the absence of Ernest Brown the business session was presided over by F. E. Ruppert, of the Anaconda Wire & Cable Company. Two addresses were made by Ernest Bridgwater and W. B. Wiegand, respectively. Mr. Bridgwater, of E. I. duPont de Nemours & Company, the first speaker, discussed the "Economics of Synthetic Rubber."

During his discourse the DuPont executive is said to have proved conclusively that the initial cost of synthetic rubber did not necessarily add excessively to the cost of the finished product over and above that same product made with natural rubber. Comparisons between the serviceability of both forms of rubber were also made by Mr. Bridgwater who displayed many recently developed items manufactured with duprene indicating the variety of uses to which synthetic rubber can be put.

The second speaker, W. B. Wiegand, of the Binney & Smith Company, who recently returned from an extensive trip through many countries, gave his impressions of the Far East. He discussed the advancement and development in the manufacture of rubber goods portrayed by rubber manufacturers he had contacted on his trip. Mr. Wiegand illustrated his discussion with motion pictures he had taken of interesting spots in the Orient.

Samuel Tinsley and Gladding Price constituted the committee in charge of arrangements for the outing, the third held since the formation of the Rhode Island Rubber Club. Lawrence D. Walker, of the Collyer Insulated Wire Company, Pawtucket, is the secretary for the group.

CHICAGO RUBBER GROUP HOLDS FALL MEETING

The first Fall meeting of the Chicago Rubber Group, of which B. W. Lewis, Wishnick-Tumpeer, Inc., Chicago, is secretary, was held on October 5 at the Hotel Sherman in Chicago. It was climaxed with a dinner held in the College Inn of the hotel.

Two papers featured the meeting, the first of which was one presented by J. P. Stanton of the Ford Motor Company on "Rubber in the Ford V-8." The speaker explained the tests made on rubber parts before they were accepted as satisfactory and dwelt upon the trials and tribulations attributed to certain parts. Mr. Stanton stated that present automobile tires were not entirely satisfactory from the standpoint of mileage in comparison with the speed of the new type automobiles.

The second paper, "Rubber in Powder Form," was read by J. B. Crockett, president, Heveatex Corporation, Melrose, Mass. Mr. Crockett discussed the possibilities contained in both pure and compounded rubber in this form and described the advantages to be gained from its use. He also described finished articles manufactured from powdered rubber. Among other items in connection with this new form of rubber Mr. Crockett touched upon its oil resistance, its combination with synthetic resins for molding, its use for the manufacture of inner tubes and additional products and other features of interest.

The entire program was in charge of Otto J. Urech, Samuel Bingham's Son Manufacturing Company, Chicago. The next meeting will be a Christmas party, which is being planned under the supervision of C. E. Frick of Van Cleef Brothers.

NEW YORK RUBBER GROUP TO MEET ON OCTOBER 19

The fall meeting of the New York Rubber Group will be held on Friday night, October 19, at the Building Trades Employers Association club room at 2 Park Avenue, New York City. The speaker for the evening will be William B. Wiegand, Binney & Smith Company, who will tell, in his own inimitable style, of impressions gained during his recent trip to the Orient. Motion pictures taken by Mr. Wiegand during his travels will also be shown.

A large crowd is expected to be on hand to hear what "Bill" has to say about the customs in the Far East as well as the methods employed by rubber manufacturers in distant lands.

As usual, the meeting will be preceded by a dinner and entertainment program. Tickets are $2.00 each. They may be procured by addressing the secretary of the group, Bruce R. Silver, New Jersey Zinc Company, 160 Front Street, New York City.

TIRE INDUSTRY FACES EARLY HIGHER PRICES

With the collapse of the "floor prices," instituted earlier in the year by the NRA as an emergency measure, on October 1, tire manufacturers were released from all rules and regulations concerning price fixing. The industry seemed faced with unavoidable chaos to be followed by still another devastating price war, but reports from various sections of the country, particularly Akron, now indicate that such a possibility will be avoided, if possible, by virtue of an agreement among the tire manufacturers themselves.

Meetings now being held in Akron and Chicago are expected to result in a concerted sales policy and a workable stabilization plan. It is generally agreed that an immediate price rise will be the first step taken by the manufacturers. (Announcement of such increases are expected around mid-October.) In the interim prices set under the NRA are generally being continued by dealers, according to report.

Reasons for the price increase include the fact that crude rubber prices are now 400% above the April 1, 1933, level, cost of cotton has increased about 160% since that date and factory wages have climbed approximately 30%.

Considerable criticism was heard from practically every division of the tire industry regarding the handling of the tire code, including the lack of enforcement facilities concerning "floor levels" under NRA supervision which was the primary reason for the national administration to wash its hands of the code and throw it wide open for tire manufacturers to figure out their own plan of campaign.

Several of the tire manufacturing executives have indicated their preference in this instance. William O'Neil, president of General Tire & Rubber Company, Akron, declared on October 8 that "now that tire manufacturers must police their own industry they probably will do a better job of it than the government has done in the past year or more." He also stated that General's business has shown a decided improvement during the first three quarters of 1934.

VULTEX SUIT ALLEGES PATENT INFRINGEMENT

On September 12, 1934, in the United States District Court for the District of Massachusetts, the Vultex Corporation of America entered suit against the Heveatex Corporation of Melrose, Mass., alleging infringement of United States patent No. 1,443,149 originally issued to Philip Schidrowitz of London, England, and acquired several years ago by the Vultex Corporation of America. This is the first United States patent issued covering the production of vulcanized latex.

The Vultex Corporation of America seeks an injunction against further infringement and the payment of profits and damages.

LOS ANGELES NEWS

Introduction of a new handy drain cleaner operating on the water pressure principle, perfected by the Golden State Rubber Mills, 651 East 61st Street, has necessitated the installation of additional hydraulic press equipment giving a capacity of 800 such items per week.

Plans have been completed by A. S. Rocklen, president and general manager, for the manufacture of a complete line of high grade bibb washers in all sizes. These are now under production and stock adequate for national distribution will be on hand by January 1.

The Union Rubber Company, Inc., 808 East 62nd Street, headed by D. T. Bolding, president, manufacturers of tire repair materials, has added new cushioning machinery doing away with the hand process of applying the cushion to the camel back.

A department for turning out a patent full circle re-treading mold, calling for twelve additional employees, has also been added. This is a self-adjusting mold and the makers claim it is revolutionary in principle. The factory is also turning out a new item in the form of a cord patch made from new cord semi-cured under pressure.

The General Rubber Products Company is the name of a new rubber goods manufacturing concern located at 916 East 59th Street. Joe Hadfield, formerly proprietor of The Lambert Laboratories at Atlanta, Georgia, is proprietor and general manager. He is assisted by I. W. Robertson, formerly with the Miller Rubber Company at Akron, Ohio. The new company occupies 9,000 feet of floor space and is working three 8-hour shifts. In addition to dipped rubber goods the company is turning out a complete line of cements for use in shoe manufacture. The firm started with fifteen employees and is already contemplating moving to larger quarters.

RUBBER COMMITTEE WILL PREPARE STANDARD TESTS

Committee D-11 on Rubber Products, of the American Society for Testing Materials, which made a number of important recommendations in standards to the Society during the past year, will give considerable attention in the future to the development of non-destructive tests of materials to protect persons from electric shock, since often the destruction of a single article for test purposes represents a substantial proportional loss. Where a human life hazard is involved the test is particularly important since 100 per cent testing is desirable and tests which destroy the serviceability of a product are not desirable.

The group working on insulated wire and cable plans to prepare a table of standards for rubber insulation thicknesses for circuits of 8000 volts to the highest voltage in commercial use. The preparation of methods of testing accelerated age deterioration of rubber has made considerable progress and it is expected definite recommendations will be made shortly.

Active work on the subject of compression testing is under way, also the drafting of tests for properties of rubber and rubber-like materials in liquids.

The Committee on Rubber Products, which was organized in 1912, has a present membership of 79. Officers elected for the coming year include H. A. Depew, American Zinc Sales Company, chairman; C. H. Zieme, Republic Rubber Company, vice-chairman; and Arthur W. Carpenter, B. F. Goodrich Company, secretary.

PREMIER RUBBER BUSY ON DUPRENE ARTICLES

According to reports from Dayton, the Premier Rubber Company is being kept busy supplying rubber products manufactured from DuPrene, the synthetic rubber developed by du Pont. The company is among the first to manufacture such articles commercially.

One of the principal items being produced from DuPrene by the Premier concern, of which John Westendorf is general manager, is gaskets. Valves also are being produced. Rubber, when in contact with oily products, such as petroleums and cold-tar distillates, swells and deteriorates rapidly. Gaskets and valves manufactured with DuPrene successfully withstand such contact and therefore are being used in pipe lines and containers in which these liquids are handled or used.

Constructing Goodyear Unit

Construction work has been started on a new $12,000 chemical storage building at plant two of the Goodyear Tire & Rubber Company, Akron. The work is in charge of Fred E. Clemmer, general contractor. The building will be one story in height, of brick and steel.

Fairfield Terminates Business

Word has reached us that the Fairfield Rubber Company, Lancaster, Ohio, with post office address in Columbus, that state, terminated its business on June 28 last. The company manufactured rubber soles, heels, slabs, etc.

Synthane Has New Material

Synthane Corporation, Oaks, Pennsylvania, has introduced a new material which is said to be "as soft as rubber and as long-wearing as Bakelite Resinoid." The new material, which apparently has not yet been given a definite trade name, consists of layers of soft rubber "sandwiched" between sheets of Bakelite Laminated, the latter a product of the Bakelite Corporation, Bound Brook, N. J. The new material is being manufactured under patents held by the latter concern. Uses of the latest Synthane product are said to include gasket applications where a combination of axial resiliency with strength and rigidity is required, vibration-absorbing machine mountings, table tops, serving trays and wall paneling.

Fix Rubber Export Duties

Starting September 16, according to the Reuters News Agency, the export duty on dry rubber from Batavia was fixed at 20 guilders per 100 kilograms. The export duty on uncleaned scrap and uncleaned earth rubber, starting on September 1, was fixed at 12 guilders per 100 kilograms.

The export duty on all other assortments of rubber from harbors in Acjah, Riouw, west and east coast of Sumatra, Tutaneoli, Banks, Sabang, Samboe and Tarempa is fixed at 16½ guilders per 100 kgs., and at 15 guilders from all other harbors.

Ohio Employment Shows Drop

Employment in rubber factories in the Fourth Federal Reserve district, which includes all of the State of Ohio, dropped slightly in July from May and June, but was reported to be 25% higher than the same month in 1933. The employment decline is traceable partly to the seasonal lull experienced by rubber factories during the Summer months. In addition, says the report made public by the Cleveland Federal Reserve Bank, the decline is attributable to heavy buying in previous months.

World Stock Statistics

World stock and known supplies of rubber in July, 1934, was estimated at 677,765 tons by the financial house of Henry Gardner & Company, London, England. This compares with 660,046 tons in June and 616,948 tons in July, 1933.

DUNLOP RUBBER COMPANY GRANTED IRISH MONOPOLY

The Dunlop Rubber Company, Ltd., of England, has been granted a monopoly on all pneumatic tire sales in the Irish Free State. To that end the company has announced the early construction of a factory at Cork to manufacture Dunlop tires. Fully 80% of Ireland's requirements will be produced at the Cork factory with the additional 20% imported from England, according to present plans.

Granting of the monopoly was said to have been conceived to bring lower tire prices to the shamrock country. Under this system the Dunlop tires will be sold much lower than current prices, and would not be more than 15% above tires sold in England. Approximately 50 tire distributors in the Free State will be forced out of business by the granting of the monopoly.

Some six hundred people will be employed in the factory at Cork which will produce additional rubber products other than tires and tubes. It is understood that various other rubber manufacturers were offered the monopoly concession, but were said to have refused it because of the small market involved. Some fear has been expressed in the Irish Free State Senate that because of the small market the factory will not prove economical and therefore tire prices would be increased.

TIRE EXPORTS INCREASE FOR SIX-MONTH PERIOD

An increase in tire exports of 28% for the first six months of 1934, compared with the same period of 1933, has been recorded, according to the September 8 issue of *Commerce Reports*. United States tire exporters shipped 648,000 pneumatic tires from January through June of the current year. Shipments for the 1933 period totalled only 508,000.

This gain becomes the more impressive when compared with the 4 per cent increase in exports of the world's principal tire manufacturing countries—exports which, in the first 6 months of 1934, totaled 2,749,000 against 2,653,000 in the like period of 1933.

The principal countries engaged in exporting automobile tires, with the number of tires exported in the first 6 months of 1933 and 1934 and the percentage of increase or decrease in the latter period, are as follows: Belgium, 295,000 to 281,000, decreased 5 per cent; Canada, 202,000 to 412,000, increased 104 per cent; France, 346,000 to 291,000, lost 16 per cent; Germany, 61,000 to 68,000, increased 11 per cent; Italy, 346,000 to 231,000, lost 33 per cent; Japan, 95,000 to 116,000, increased 22 per cent; United Kingdom, 800,000 to 702,000, lost 12 per cent; and United States, 508,000 to 648,000, gained 28 per cent.

Golf Ball Imports Decrease

Imports of golf balls, according to the Bureau of Foreign and Domestic Commerce, of the Department of Commerce, Washington, D. C., during August, 1934, amounted to 39,840, valued at $9,745, a unit value of 24.5 cents per ball. This compares with unit values of 21.9 cents per ball in July and 25.6 cents in June of the current year. Tennis balls imported during August numbered 43,384, representing a value of $6,274. Other rubber ball imports during the month amounted to 54,908, or a value of $2,700.

Names in the News

JOSEPH W. AYERS, director of research, C. K. Williams & Company, Easton, Penna., was married on October 6 to Miss Caroline B. Stone of Lexington, Massachusetts. The bride was graduated from both the Emma Willard School and Vassar College. Mr. Ayers is a graduate of Cornell University.

H. F. SCHIPPEL, service manager, B. F. Goodrich Company, Akron, gave an address on the "Uses of Rubber" before the Cleveland Engineering Society on September 17 at Cleveland, Ohio.

B. M. ROBINSON, general counsel, Firestone Tire & Rubber Company, Akron, was scheduled to address the rubber section division of the National Safety Council during the 23rd Annual Safety Congress at Cleveland the week of October 1.

F. R. HOADLEY, Farrel-Birmingham Company, Ansonia, Connecticut, was one of a group of industrial executives attending a session of durable goods manufacturers at Hot Springs last month during which a Durable Goods Industries Committee was formed.

C. H. CARLISLE, president, Goodyear Tire & Rubber Company of Canada, has returned to his desk in Toronto following an extended trip of the western provinces.

DR. OWEN THOMPSON, research chemist, Dayton Rubber Company, Dayton, Ohio, has sailed for Paris, France where he will work in the Citroen Motor Car Company plant for the next three months. Dr. THOMPSON has been "loaned" to the French manufacturers.

PHILIP A. BAUMANN, associated with the art department of the Firestone Tire & Rubber Company, Akron, has designed a poster advertising the Akron Art Institute's Carnival.

H. S. MCPHERSON has been appointed manager of mechanical sales for the St Louis district by United States Rubber Products, Inc. Formerly in the Boston area, Mr. McPherson has been associated with the company for the past fifteen years.

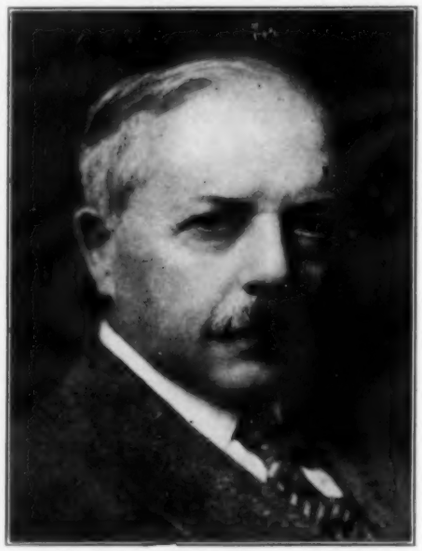
W. G. MUELLER, for 25 years a salesman for the United States Rubber Products, Inc., has been appointed manager of mechanical sales for the Boston area, replacing MR. MCPHERSON who was transferred to St. Louis.

HARRY E. BLYTHE, vice-president, sales service, Goodyear Tire & Rubber Company, Akron, is reported rapidly recovering from injuries received in an auto accident near Cleveland recently.

JAMES V. RYAN, formerly with Whitehead Bros. Rubber Company, Trenton, N. J., is now associated with the laboratories of the New York Rubber Company, Beacon, N. Y.

LOWELL FESS has resigned his position with the Firestone Tire & Rubber Company, Akron, to manage his famous father's campaign to retain his seat in the Senate. His father is Senator SIMEON D. FESS.

Fete Frank A. Seiberling



Frank A. Seiberling, rubber pioneer, and president of Seiberling Rubber Company, was feted by leading business and civic leaders of Akron on October 6, the occasion being the 75th birthday of the man who has earned the soubriquet of "Little Napoleon." Mr. Seiberling entered the rubber industry in 1898 and headed the Goodyear Tire & Rubber Company as president until 1919. The testimonial was in the form of a banquet.

DAVID SPENCE has been engaging in private rubber research in his own laboratories in Carmel, California for the past year. He was formerly connected with the Guayule interests of the Continental Rubber Company of New York.

EDWARD ROSENDAHL, technical advisor, Glyco Products Company, Inc., Brooklyn, New York, has been appointed vice-president and general manager of that company. Mr. Rosendahl was formerly Professor of Chemistry in the Sassoon College, Baghdad, Iraq.

EARL GULICK, production superintendent, tire division, B. F. Goodrich Company, Akron, has been transferred to the Canadian Goodrich Company, Ltd., Kitchener, Ontario, where he becomes plant superintendent. H. B. CASH has succeeded Mr. GULICK in the Akron plant.

HARRY CHATFIELD, on a leave of absence from his duties as head of the efficiency department at the Goodyear-Sydney, Australia, plant, is spending his time in Akron, where he expects to remain for one full year.

THOMAS MARS has been elected to the presidency of the Foremen's Club of the B. F. Goodrich Company's tire division. Other officers include CHARLES CLARK, M. PATTERSON, C. E. WILLIAMS and WILLIAM WHITE.

Appoint Townsend to Committee

A. L. Viles, President of the Rubber Manufacturers Association, Inc., has announced that the Board of Directors of the Association, at a meeting held October 3rd, appointed Colonel A. F. Townsend, Chairman of the Board of Raybestos-Manhattan, Incorporated, and Chairman of the Board of the Association, as a member of the Advisory Panel of the International Rubber Regulating Committee. Colonel Townsend sailed on the "Majestic," October 12th, to attend an important meeting of the International Rubber Regulating Committee in London on October 30th.

JAMES COMP has been elected president of the Foremen's Club, Processing Division, B. F. Goodrich Company, Akron. William Fanning occupies the vice-president's chair.

NORMAN A. SHEPARD, director of chemical research, Firestone Tire & Rubber Company, Akron, addressed the American Institute of Chemists at a luncheon on September 13 pertaining to the "Problems of the Institute." Mr. Shepard would like to see states license chemists.

HOWARD LAW, formerly operating his own advertising agency in Philadelphia, has been appointed advertising manager of the Thermoid Rubber Company, Trenton, N. J.

M. M. LATTA has been elected president and general manager of the Western Rubber Company, Goshen, Indiana. He succeeds Mr. George B. Slate, recently deceased.

H. E. VAN PETTEN, advertising manager, mechanical goods division, B. F. Goodrich Company, Akron, was one of the speakers on the program of the National Industrial Advertisers Association during its meeting in Cincinnati last month.

F. A. SEIBERLING and JAMES D. TEW, presidents of the Seiberling Rubber Company and the B. F. Goodrich Company, respectively, both attended a conference at Washington, D. C., on September 25 called to discuss details of acquainting the public with the Federal Housing Act.

H. E. SIMMONS, president of Akron University and vice-chairman of the Rubber Division, A.C.S.; NORMAN A. SHEPARD, chemical engineer, Firestone Tire & Rubber Company; and CHARLES W. SEIBERLING, vice-president, Seiberling Rubber Company; all of Akron, are listed for the first time in the current 1934 edition of "Who's Who in America."

A. B. MATTHEWS has been promoted to manager of the Employment Division, Goodyear Tire & Rubber Company, Akron. He has been with the company since 1917.

JOHN G. GATES, secretary, Gates Rubber Company, Denver, Colorado, is scheduled to address a group meeting at the Denver Temple of Youth on October 18. Mr. Gates will speak on the general topic of "Manufacturing."

C. T. HUTCHINS, manager, advertising department, Goodyear Tire & Rubber Company, Akron, was presented with a 20-year service pin last month. He has been with the company since 1914 and has occupied his present post since 1928. R. S. WILSON, vice-president and sales manager, made the presentation.

NEW ENGLAND NEWS

Operations in the waterproof footwear division of the U. S. Rubber Company, Naugatuck, Conn., were partially suspended from September 15 to 28, with only skeleton forces employed. Decreased sales requirements and a shortage of textiles were factors making the shutdown necessary, according to Factory Manager Walter H. Norton. The company spent nearly $2,000,000 in Connecticut last year for materials alone, it was reported recently, this figure not taking into consideration the payrolls of the four Nutmeg State plants of the company. These plants are the footwear division in Naugatuck, the Naugatuck Chemical Company, the Shoe Hardware Company, Waterbury, and the Fabric Fire Hose Company, Sandy Hook.

Improved demand for parts used in equipment for the grinding of rubber printing press rolls is reported by the Porter-McLeod Machine Tool Company, Hatfield, Mass. The trend indicates better business in the printing field and in the business of those supplying printers' equipment.

A storehouse at the plant of the Norwalk Tire & Rubber Company, Norwalk, Conn., collapsed September 14 after the walls were undermined by flood waters. Damage was estimated by Factory Manager Louis P. Arnold at about $2,000. The storehouse contained a large quantity of battery containers, advertising matter and other material.

Directors of the Elastic Products Company, Bridgeport, Conn., manufacturer of garters and garter belts, have filed a petition in Superior Court for dissolution of the corporation. The directors, Ralph T. Fairchild, John T. L. Hubbard and Leroy Sanford, claim that the assets of the company are in danger of waste.

The National Sherardizing & Machine Company, Hartford, Conn., have purchased from the Clyde E. Lowe Company, Cleveland, the complete equipment of that company. The Lowe concern was the principal manufacturer of circular mandrels used by the rubber industry both here and abroad. Patent to cover the manufacture of these mandrels was also acquired. The National company is now in a position to supply the trade with circular mandrels in all the popular sizes in addition to its regular sherardized straight mandrels in steel and aluminum. Stock shells for all purposes are kept in stock and are supplied in either welded or seamless stock.

Rubber Exhibition in Museum

Opened in early October, a rubber exhibition is being held in the Science Museum, South Kensington, London, England. It is to continue for a minimum period of three months. The exhibition was arranged by the Rubber Growers' Association, in collaboration with the Rubber Research Institute of Malaya, the Research Association of British Rubber Manufacturers, the London Advisory Committee for Rubber Research, rubber manufacturers and suppliers of equipment and machinery. The exhibition demonstrates the story of the rubber industry from plantation to finished product. It is divided into five sections, including: plantation, manufacturing processes, scientific treatment, applications and historical exhibits.

New Tire Manufacturer

American Tire Factories, Inc., an organization recently incorporated in Indiana, will soon open a plant to manufacture tires. The plant, according to report, is to be located at Center and Wheatland avenues, in Logansport. Articles of incorporation show 1,000 shares of no par value stock. Incorporators include Robert W. Seiberling, S. O. Berman and L. E. Wickersham.

Carlisle Adopts New Valve

Carlisle Tire & Rubber Company, Carlisle, Pennsylvania, has adopted the recently-announced rubber covered base valves for its entire tube production. The new valves, when cured to the inner tube, eliminate all joints around the valve base, were developed by a Schrader's Son, Brooklyn, N. Y.

Seniority Rules at Goodrich

B. F. Goodrich Company, Akron, has adopted new seniority rules as a result of the Goodrich Co-Operative Plan Representatives. These rules which cover lay-offs, shift preferences, transfers, etc. will continue until January 1, 1935, at which time the present rules will be revised, if necessary, and permanent regulations adopted. In all cases seniority governs with certain exceptions noted in the new rules.

Lists Michigan Expenditures

The growing importance of Michigan as a rubber manufacturing state was emphasized by a report made public by the United States Rubber Company. In addition to hundreds of thousands of dollars paid to workers employed in the Detroit plants of the company, it lists expenditures for raw materials purchased in the state at approximately two million dollars. More than 100 different items comprised this expenditure including trucks, pigments, chemicals, rubber solvents, tools, lamps, etc. About 5,000 people are employed in its Detroit tire plants.

Safety Speakers Available

The Metropolitan Chapter, American Society of Safety Engineers, 29 West 39th Street, New York City, has organized a Speakers' Bureau consisting of 50 authorities on accident prevention. Lewis H. Carris is chairman of the committee which furnishes speakers without charge to industrial plants to discuss topics on accident prevention. Rubber manufacturers may take advantage of this offering.

RUBBER ABSORPTION IS INCREASED 34 PER CENT

According to the Department of Commerce, absorption of crude rubber throughout the world increased 34 per cent during the first six months of 1934, compared with the same period last year. Consumption also materially increased estimated figures being 510,846 long tons for the 1934 period against 381,915 long tons in the first six months of 1933.

Two factors are believed to be largely responsible for these greater takings: first, world economic recovery, which would require larger amounts of staple commodities like rubber; and, second, the restriction of rubber output by producing countries and the consequent threat of higher prices, which would stimulate consuming countries to increase crude rubber stocks against a possible future shortage.

Only 3 major rubber-manufacturing countries absorbed less rubber than in the 1933 half-year, namely, Australia (decline of 37 per cent), France (17), and Japan (only 3 per cent).

All other countries enlarged their takings of rubber, the more important increases occurring in United States (43 per cent), United Kingdom (55), Canada (92), Czechoslovakia (96), Germany (43), Italy (12), Russia (65), Spain (81), Switzerland (163), and the Scandinavian countries (54).

United States absorption of rubber amounted to 51 per cent of total world absorption during the first six months of 1934.

LEVY, OF FISK RUBBER, RIDICULES TIRE TRENDS

Edward D. Levy, president, Fisk Rubber Corporation, Chicopee Falls, Mass., in an open letter to tire dealers, recently criticized and ridiculed current advertising methods in the tire field. Extravagant claims, stress of safety factors, and additional items fell under the blow of Mr. Levy's wrath, who stated "Fantastic advertising will never take the place of business brains—and salesmanship."

In summing up current advertising trends Mr. Levy called it "a war of meaningless words." He also commented that "tread stocks are not improved by the addition of printing inks to the compounds and tire mileage never yet came out of an ink bottle."

Gets Army Boots Order

United States Rubber Products Company, New York City, was the lowest bidder to supply 4,000 pairs of rubber hip boots and 4,000 pairs of short boots for delivery to five army depots last month. Other bidders for the valued order included Converse, Hood and Firestone Footwear Company. Prices quoted by the successful bidder, net delivery at all points, were $2.15 per pair for hip boots and $1.44 per pair for the short, heavy rubber boots.

Move Offices to New York

General offices of the Rubberset Company, Newark, N. J., have been moved from that city to 75 West Street, New York City. The latter address is the headquarters of the Bristol-Myers Corporation, which recently acquired the Rubberset concern.

Obituaries

George B. Slate

George B. Slate, president, Western Rubber company, Goshen, Indiana, died on September 6 following a stroke of apoplexy. He was 70 years old and had been in ill health for several years. In addition to his activities in the rubber industry Mr. Slate was prominent in Goshen civic affairs and was president of the school board for many years. Funeral services were held at his home, 628 South Fifth Street. Burial was in Violette Cemetery. The deceased leaves a widow and daughter.

Arthur W. Van Attan

Former purchasing agent for the Lambertville Rubber Company, Lambertville, N. J., Arthur W. Van Attan died on September 13th in his home at Mountain Lakes, N. J. Death was due to angina pectoris from which he had suffered for many years. Mr. Van Attan was born in Washington, N. J. fifty-eight years ago, moved to Lambertville in his early boyhood and was associated with the Lambertville rubber concern for the past 30 years. He is survived by his widow, daughter and sister.

Ralph A. Peavey

Ralph A. Peavey, veteran of the tire industry, died on September 9 following an attack of thrombosis. Starting as a successful tire distributor in Dallas, Texas and Boston, Mass., Mr. Peavey sold his interest in 1921 to become associated with the old Ajax Rubber Company in the post of vice-president. The Ajax concern was later consolidated with the McClaren Rubber Company, Charlotte, N. C.

James Q. Goudie

James Q. Goudie, one of the old-timers of the rubber industry, died at his home in Bloomfield Hills, Michigan, on September 19. Death was attributed to a kidney infection. In 1906 Mr. Goudie was appointed manager over the Michigan territory for the old Diamond Rubber Company. In 1910 he was established as district manager for the Pennsylvania Rubber Company which position he occupied until 1923. Funeral services were conducted on September 21 at Hamilton's Chapel.

Charles S. Eddy

Charles S. Eddy, former traffic manager for the B. F. Goodrich Company, dropped dead from heart disease on October 2 in front of his home in Akron. Born in Jamestown, N. Y. seventy-four years ago, Mr. Eddy joined the Goodrich company in 1880 and remained with that concern for twenty-seven years, retiring several years ago. Besides his widow, he leaves a daughter.

Joseph E. Davis

Joseph E. Davis, an executive of the New York Rubber Company, Beacon, New York, died at his home in the Hotel Holland in Beacon on September 26. He was seventy-six years old. Mr. Davis is said to be responsible for many improvements in the manufacture of mechanical rubber goods, devoting most of his life to the rubber industry. He was graduated from Harvard in 1883. He is survived by two sons, a daughter and three sisters. One of his sons, Edwin S. Davis, is manager of the New York Rubber Company.

Resume Goodyear Hearings

Hearings were resumed in mid-September on the suit brought by the Federal Trade Commission against the Goodyear Tire & Rubber Company, Akron, alleging violation of the anti-trust laws. They were resumed after a three week respite. Practically every daily session during the past month was occupied by testimony of dealers presented by the tire company to refute the claim of the Commission that its contract with Sears-Roebuck injured the sales of independent tire dealers by permitting the mail order concern to undersell competition. Prior to resumption of the hearings, at Chicago, the Federal Trade Commission upheld a decision by Trial Examiner John W. Bennett in refusing to permit the introduction of certain accounting exhibits presented by Goodyear attorneys.

Strike Settlement Predicted

Although the strike at the American Hard Rubber Company factory in Akron is still being waged, despite previous predictions of an early agreement between the employers and the workers, word from Akron assures a positive settlement within the very early future. Ralph A. Lind, regional labor director, of Cleveland, has been called into the controversy by the National Labor Relations Board. The strike, which affects some 500 workers, has continued for almost two full months.

Champion in Motor Field

Champion Rubber Company, Akron, has announced its entry into the automotive field with a line of replacement mats, radiator hose, cut connections, brake lining, running board matting, and washer hose. Distribution of these rubber parts will be made through the company's regular jobbing channels.

Increases Synthetic Output

The first synthetic rubber factory in Russia, located at Yaroslavl, just recently celebrated its second anniversary. During its first year of existence the factory produced 371 tons of synthetic rubber and 2,363 tons were produced during the second year. Plans call for a large production increase for the coming year.

Installs New Equipment

The Hohwieler Company, Morrisville, Pennsylvania, has installed new equipment to take care of its increased business. The company manufactures molded rubber articles including dental and biological items, and acid and oil resisting molded rubber for mechanical movements. The plant is equipped for rubber experimental work of all kinds in addition to the design and production of molds and dies for the rubber and plastic industries.

Financial

BRITISH MONSANTO FIRM ISSUES NEW OFFERING

Monsanto Chemicals Limited, the British subsidiary of Monsanto Chemical Company, St. Louis, Mo., has sold to bankers £400,000 out of an authorized issue of £500,000 of its non-voting cumulative preferred stock. Offering to the public will be made at twenty shillings six pence per share, or six pence above par.

The prospectus discloses that there are no sinking fund requirements and that the issue may be retired before 1970 at twenty-one shillings six pence, or seven and one-half per cent premium. No guarantee by the parent company is involved. Monsanto Chemical Company retains all of the 600,000 shares of common stock.

Canadian Goodyear Dividend

The regular quarterly dividend of $1.25 on common stock, and $1.75 on preferred stock, both payable October 1 to stock of record September 15 was declared last month by the Goodyear Tire & Rubber Company of Canada, Montreal.

In a letter accompanying dividend checks C. H. Carlisle, president, stated that volume of sales and profits for the company during the past nine months have materially exceeded those of the like period last year. He advised that profits accrued during this period were sufficient to cover dividend requirements for the current year at rates heretofore paid.

Postpone Recapitalization

A special meeting of stockholders of the Dayton Rubber Manufacturing Company, Dayton, Ohio, held on September 21, which was called to discuss pending recapitalization plans, ended in an early adjournment with such plans postponed until further notice. Final details regarding recapitalization are expected to be announced shortly.

Pirelli Cash Distribution

A cash distribution to holders of American shares representing capital stock Series A of the Pirelli Company, of Italy, at the rate of $8.45 a share, payable on October 6 to holders of American shares of record as of September 28, will be made by the City Bank Farmers Trust Company, New York City, as the depositary.

Declares Regular Dividend

The New Jersey Zinc Company, New York City, declared the regular quarterly dividend of 50 cents on September 26. The dividend is payable November 10 to stock of record October 20.

Increase in Rubber Duty

According to a Reuter's Cable from Batavia to the Commodity Exchange in New York the export duty on rubber from Djambi, Palembang and Southeast Borneo was raised from 15 to 16 guilders per 100 kilograms, effective October 1.

New Rubber Goods

Inflatable Mickey Mouse

Add another item to the popular line of toys featuring Walt Disney's Mickey Mouse. Seiberling Latex Products Company, Akron, Ohio, has brought forth an

inflated replica of the well-known character by exclusive permission of the Disney Enterprises. The new toy is 12 inches high, is made of heavy gauge rubber, and is attractively decorated in red and black on white, and retails for 10 cents each.

Hot Material Belt Developed

B. F. Goodrich Company, Akron, has developed a new hot material belt which embraces the same principles of heat resistance used in connection with the company's Golden Ply tires. The belt cover offers greater resistance to abrasion after prolonged exposure to heat, according to the manufacturers, in addition to greater flexing life than the average belt in its original state.

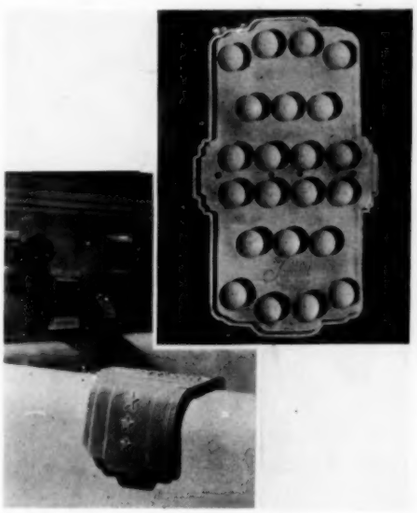
Tire Valve Development

A new tire valve system has been developed by the Dill Mfg. Company, Cleveland. The base is rubber semi-vul-

canized directly on the metal stem which in turn is fully vulcanized into an integral part of the inner tube at the time the tube is cured. Complete elimination of all possible leaks is thus assured, according to the manufacturer, at the valve stem base. Durability, rigidity and appearance of the metal stem are retained with the disadvantage of application to the tube removed.

Safety Bath Tub Grip

An interesting novelty, designed to lessen the appalling number of accidents traced to bath tubs in the home, has been introduced by The Savafal Company, 39 East 19th Street, New York City. Termed the "Savafal" bath grip, the new item consists of a thin sheet of metal covered by soft molded rubber in attractive design as shown in the illustration. The under side of the grip has 22 suction cups which hold it firmly to the edge and side of the bath tub over which it is gracefully folded. A raised apron on the under side of the grip keeps the suction cups from receiving the water splash. Raised decorations of laurel leaf and stars adorn the upper portion and



assist the hand in maintaining a firm hold. It is attractively packaged in flat folding box form with the grip itself being wrapped in cellophane. Merchandised through leading department stores "Savafal" is available in seven different colors to harmonize with bathroom fixtures.

Rubbertex Floor Covering

A new floor covering under the name of Rubbertex has been introduced by the Mannington Mills, Salem, N. J. According to the manufacturer, the material is made of fabric specially treated by chemical rubberization.

Deodorant Dress Shield

The I. B. Kleinert Rubber Company, New York, N. Y., is now marketing a new rubber dress shield which deodorizes. It is being sold under the trade name of "Recherche."

An All-Rubber Football

A re-enforced all-rubber football has been added to the toy line featured by the Faultless Rubber Company, Ashland,

Ohio. It is of regulation size, heavy enough for kicking and accurate passing. It is equipped with an inflating valve and requires no tying or lacing. The all-rubber footballs come packed in individual gift boxes or in bulk.

Goodrich Nail Hole Patch

B. F. Goodrich Company, Akron, has perfected a new nail hole patch for pneumatic tires, replacing the old fashioned tire plug. It automatically seals up nail holes, prevents ply separations and protects the inner tube, according to the manufacturers. The new patch is constructed with a semi-cured face, with a substantial plug of self-vulcanizing rubber to be placed over the hole. Pressure from the tube and flexing action of the tire in service causes the self-vulcanizing rubber to flow into the injury, completely sealing it. This action prevents dirt and grit from getting into the nail hole which usually causes separation and chafing of the tire.

Printing Set Uses Rubber Type

An attractive new hand-operated toy printing press, designated as the "Fulton No. 80" has been introduced by the Fulton Specialty Company, toy manufacturers of Elizabeth, N. J. It is finished

in red and green lacquer applied over a durable cast iron frame. A self-inking device provides plenty of ink for the metal-grooved type-holder. A complete standard 3A font of movable rubber type is included with every press, each of which weighs 2½ pounds.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, OCTOBER 9, 1934

Crude Rubber

SINCE our last report several disturbing factors relative to the restriction scheme, including Siam's refusal to sign the pact, India's demand for an increased quota and reports that the 1935 quotas would be 30% lower, caused a steady decline in daily prices. Due to the disappointing tone of President Roosevelt's radio address early in October rubber suffered the year's widest decline of 66 points dropping from 14.46 on October 2 to 13.80 on October 3. Prices for futures also have dropped in the same ratio with small gains recorded for December deliveries on October 8 up about 7 points. Shipment offers on c.i.f. terms from the Far East are much fewer than anticipated attributed to declining prices. An early rise is expected as soon as minor restriction disturbances, such as mentioned above, are overcome. Quotations in the outside market, Exchange, London and Singapore follow:

As of October 8

Plantations—

Ribbed Smoked Sheets—			
Spot	—	@	.14
October	—	@	.14
Nov.-Dec.	—	@	.14⅛
Jan.-Mar.	—	@	.14½
First Latex, crepe spot	—	@	.15
Amber Crepe, No. 2	—	@	.11⅜
Amber Crepe, No. 3	—	@	.11¼
Amber Crepe, No. 4	—	@	.11⅜
Brown Crepe, clean thin	—	@	.11⅜
Brown Crepe, rolled	—	@	.09¼

Latex—

Liquid Latex, per gal.	.55	@	—

Paras—

Up-River, fine	—	@	.10½
Acre Bolivian, fine	—	@	.10¾

Balata—

Block, Ciudad	—	@	.44

LONDON MARKET

Standard Smoked Sheets—Buyers—Oct. 8

October	—	@	6 7/16d
Jan.-Mar.	—	@	7 1/16d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—Oct. 8

October	—	@	6 13/16d
Jan.-Mar.	—	@	7 1/16d

Reclaimed Rubber

Demand for reclaim is reported fair with somewhat more interest shown than in the past few months. August figures for reclaim consumption show a further increase in percentage to crude, the latest figure being 25.5% compared to 25% in July and 23.5% in June. Ample supplies of scrap are on hand to meet the demand for reclaims which is expected before the end of the year. Quotations are unchanged since our last report.

High Tensile

Super-reclaim, black	.08¾	@	.09
High Tensile Red	.07	@	.07¼

Shoe

Unwashed	.06½	@	.06¾
Washed	.08	@	.09

Tube

No. 1 (Floating)	.13	@	—
No. 2 (Compounded)	.07½	@	.07¾

Tires

Black	.05	@	.05¼
Black, selected tires	.05¼	@	.05½
Dark Gray	.06¼	@	.06½
White	.09½	@	.09½
Truck, Heavy Gravity	.05½	@	.06
Truck, Light Gravity	.06	@	.06¼

Miscellaneous

Mechanical blends	.04¼	@	.04½

Scrap Rubber

Scrap rubber is quiet with little interest shown by dealers at present levels. Reclaimers demands are slight at this writing with ample supplies reported on hand. An upturn is expected, however, looked for within the next two months. Current quotations follow:

(Prices to Consumers)

Auto tire peelings	ton 18.00	@	20.00
Mixed auto	ton 9.00	@	10.00
Clean solid truck tires	ton 35.00	@	37.50
Boots and shoes	ton 20.00	@	21.50
Arctics, untrimmed	ton 16.00	@	17.50
Inner tubes, No. 1	lb. .06¾	@	.07
Inner tubes, No. 2	lb. .03½	@	.03½
Inner tubes, Red	lb. .02⅜	@	.02½

Cotton

Prices have dropped approximately 100 points from 13.40 on September 4 to 12.35 on October 8 since our last report. Trading has been very quiet with the trade showing a decided inclination to mark time. This inclination resulted in declines of from 33 to 39 points last week. Weakness in the market is attributed to higher estimates on crops, declines in sterling and uncertainty as to the effect of bids for pooled cotton. As brokers predicted, the government estimate as of October 1 was higher than the preceding month, being 9,443,000 bales compared with 9,252,000 bales as of September 1, an increase of 2.1 per cent. This latest estimate is 3,604,000 bales below last year's crop and 5,223,000 bales below the 1928-32 average. Release of the government estimate caused a slight rise in futures with December deliveries gaining 18 points and subsequent months approximately 15 points. Quotations on the N. Y. Cotton Exchange for Middling Uplands follow:

	Sept. 8	October 8		
	Close	High	Low	Close
October	13.15	12.24	12.01	12.03
December	13.27	12.39	12.00	12.14
March	13.36	12.50	12.14	12.25

Tire Fabrics

(Prices Net at the Mill—Process Tax Included)

Peeler, carded, 23/5/3	lb. .39½	@	—
Peeler, carded, 23/4/3	lb. .40½	@	—
Peeler, carded, 15/3/3	lb. .37½	@	—
Peeler, carded, 13/3/3	lb. .36½	@	—
Egyptian, carded, 23/5/3	lb. .49½	@	—
Egyptian, combed, 23/5/3	lb. .54½	@	—
CHAFERS			
Carded, American, 1 1/8"	lb. .39	@	.40
Carded, American, 1"	lb. .31½	@	.34½
LENO BREAKER			
Carded, American, 1 1/8"	lb. .39	@	.40
Carded, American, 1"	lb. .31½	@	.34½

Sheetings

Count	Width	Weight			
48x40	36 in.	5.50	lb.	— @	.05¾
40x40	36 in.	6.15	lb.	— @	.05
40x36	36 in.	6.50	lb.	— @	.04⅞
48x48	40 in.	2.50	lb.	— @	.11⅜
48x48	40 in.	2.85	lb.	.10¾ @	.11
64x68	40 in.	3.15	lb.	— @	.10½
56x60	40 in.	3.60	lb.	.09 @	.09¼
48x44	40 in.	3.75	lb.	— @	.08⅝
44x40	40 in.	4.25	lb.	— @	.07½

Ducks

Enameling	lb. .32	@	.37½
Belting and Hose	lb. .34	@	—
Single filling, A grade	lb. .16¾	@	.17¼
Double filling	lb. .17¾	@	.18¼

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM SEPTEMBER 10 TO OCTOBER 8

Date	Spot	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Sales
Sept. 10	15.65	15.65	15.77	15.90	16.03	16.15	16.28	16.41	16.53	16.65	16.79	16.93	17.07	——	125
11	15.70	15.70	15.82	15.94	16.07	16.19	16.32	16.45	16.59	16.73	16.86	16.99	17.12	——	177
12	15.58	15.58	15.69	15.80	15.91	16.03	16.15	16.29	16.42	16.54	16.67	16.80	16.93	——	242
13	15.32	15.32	15.42	15.55	15.68	15.81	15.95	16.09	16.21	16.34	16.45	16.56	16.68	——	591
14	15.05	15.05	15.15	15.27	15.39	15.51	15.65	15.79	15.91	16.04	16.17	16.30	16.43	——	935
15	15.20	15.20	15.29	15.41	15.54	15.66	15.80	15.94	16.07	16.21	16.34	16.48	16.62	——	161
16															
17	15.25	15.24	15.30	15.42	15.55	15.66	15.79	15.92	16.05	16.18	16.31	16.45	16.59	——	418
18	15.15	15.15	15.25	15.35	15.45	15.57	15.70	15.84	15.96	16.08	16.21	16.35	16.49	——	148
19	15.00	14.95	15.00	15.12	15.24	15.36	15.50	15.64	15.76	15.87	15.99	16.11	16.24	——	316
20	15.15	15.12	15.15	15.26	15.38	15.50	15.62	15.75	15.89	16.04	16.17	16.30	16.43	——	258
21	15.38	15.39	15.46	15.57	15.69	15.82	15.96	16.09	16.21	16.33	16.45	16.58	16.71	——	533
22	15.38	15.33	15.39	15.51	15.64	15.75	15.90	16.05	16.16	16.28	16.39	16.50	16.62	——	143
23															
24	15.35	15.30	15.36	15.49	15.63	15.76	15.89	16.04	16.15	16.29	16.41	16.54	16.60	——	175
25	15.31	15.31	15.34	15.44	15.54	15.67	15.80	15.93	16.05	16.16	16.26	16.36	16.48	——	220
26	15.05	14.97	15.00	15.12	15.25	15.38	15.51	15.64	15.75	15.86	15.99	16.12	16.24	——	306
27	14.87	14.82	14.85	14.96	15.07	15.20	15.33	15.45	15.58	15.72	15.84	15.96	16.08	——	743
28	14.68	——	14.65	14.76	14.87	14.98	15.12	15.26	15.37	15.50	15.61	15.73	15.85	——	516
29	14.82	——	14.82	14.93	15.04	15.17	15.29	15.41	15.52	15.64	15.76	15.89	16.01	——	137
30															
Oct. 1	14.28	——	14.19	14.30	14.41	14.52	14.65	14.79	14.91	15.03	15.15	15.26	15.38	15.48	636
2	14.47	——	14.46	14.58	14.70	14.80	14.95	15.10	15.22	15.35	15.47	15.58	15.70	15.82	582
3	13.82	——	13.80	13.92	14.04	14.17	14.29	14.43	14.53	14.63	14.75	14.88	15.00	15.12	743
4	13.88	——	13.80	13.92	14.05	14.17	14.29	14.41	14.52	14.65	14.76	14.86	14.97	15.09	833
5	13.62	——	13.52	13.64	13.76	13.87	13.98	14.10	14.20	14.31	14.43	14.59	14.71	14.83	877
6	13.80	——	13.75	13.86	13.97	14.09	14.22	14.35	14.46	14.57	14.67	14.78	14.90	15.02	134
7															
8	13.88	——	13.84	13.94	14.06	14.18	14.30	14.43	14.54	14.64	14.75	14.85	14.97	15.09	382

Rubber CHEMICAL Markets

NEW YORK, OCTOBER 10, 1934

[All Quotations F.O.B. Works Unless Otherwise Noted]

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.21 @	.25
A-5-10	lb.	.33 @	.36
A-7	lb.	.53 @	.65
A-11	lb.	.60 @	.75
A-16	lb.	.55 @	.65
A-19	lb.	.56 @	.75
A-32	lb.	.70 @	.80
A-17	lb.	— @	—
Aldehyde ammonia, crystals	lb.	.65 @	.67
Altax	lb.	— @	—
Captax	lb.		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.46 @	.47
Diphenylguanidine	lb.	.36 @	.37
Ethylidene aniline	lb.	.45 @	.47½
Formaldenyde aniline	lb.	.37½ @	.42
Guantal	lb.	.42 @	.51
Heptene	lb.	.40 @	—
Hexamethylene-tetramine	lb.	.37 @	—
Lead Oleate, No. 999	lb.	.10 @	—
Witco	lb.	.10 @	—
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.36 @	.37
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.50 @	.55
Pipsolene	lb.	3.55 @	4.00
R & H 40	lb.	.40 @	.41
R & H 50	lb.	.40 @	.41
R-2	lb.	1.55 @	1.90
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Thiocarbanilid, drums	lb.	.21 @	.25
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.62 @	1.00
Ureka C	lb.	.58 @	.69
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.	.48 @	.60
Zimate	lb.		
Inorganic			
Litharge, domestic	lb	.06¼ @	.06½
Magnesia, calcined, heavy	ton	60.00 @	65.00

COLORS

Blacks (See Compounding Materials)

Blues			
Prussian	lb.	.36 @	.38
Ultramarine	lb.	.12 @	.15
Browns			
Sienna, Italian	lb.	.06 @	'13
Umber, Turkey	lb	.04 @	.04½
Greens			
Chrome, light	lb.	.20 @	.30
medium	lb.	.21 @	.31
dark	lb.	.24 @	.30
Chromium Oxide, bbl.	lb.	.22 @	.23
Reds			
Antimony			
crimson, 15/7	lb.	.46 @	—
sulfur, free	lb.	.48 @	.52
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼ @	—
Whites			
Cryptone CB, No. 21	lb.	.06 @	.06¼
Cryptone, No. 19	lb.	.06 @	.06¼
Lithopone			
Albalith, black label—11	lb.	.04½ @	.04¾
Azolith		.04½ @	.04¾
Rayox	lb.		
Titanium oxide	lb.	.17 @	.19
Titanox B	lb.	.06 @	.06½
Titanox C	lb.	.06 @	.06½
XX—20 Zinc Sulphide, bbls.	lb.	.11 @	.11¼
XX—86 Zinc Sulphide, bbls.	lb.	.11 @	.11¼
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.06½ @	.06¾
ZZ (leaded)	lb.	.06¼ @	.06½
Horsehead Lead Free Brand:			
Special—3	lb.	.06½ @	.06¾
XX Red—4	lb.	.06½ @	.06¾
XX Red—72	lb.	.06½ @	.06¾
XX Red—78	lb.	.06½ @	.06¾
XX Red—103	lb.	.06½ @	.06¾
U. S. P.—X, bbls.	lb.	.12½ @	.12¾
Kadox, black label—15	lb.	.09⅜ @	.09⅝
Blue label—16	lb.	.08⅜ @	.08⅝
Red label—17	lb.	.07 @	.07¼
St. Joe, black label	lb.	.06½ @	.06¾
green label	lb.	.06½ @	.06¾
red label	lb.	.06½ @	.06¾
Zinc Oxide—French Process			
Anaconda, lead free	lb.	.06½ @	.06¾
Anaconda, selected lead free	lb.	.06¾ @	.07
Florence White seal—7 bbls.	lb.	— @	.10⅝
Green seal—8	lb.	.09¾ @	.09¾
Red seal—9	lb.	.08¾ @	.08¾
Yellows			
Chrome	lb.	.15 @	.16
Ocher, dom. med.	lb.	.01½ @	.02

BLACKS

Arrow "Aerfloted" Specification	lb.	.0535 @	.0825
Bone, powdered	lb.	.05½ @	.12½
Carbon, compressed	lb.	.0535 @	.0825
uncompressed	lb.	.0535 @	.0825
"Certified," Cabot	lb.	.0535 @	.0825
Spherons	lb.	.0535 @	.0825
"Disperso"	lb.	.0535 @	.0825
Drop, bbls.	lb.	.05½ @	.14
"Excello," compressed	lb.	.0535 @	.0825
"Fumonex"	lb.	.03 @	.07
"Gastex"	lb.	.03 @	.07
Lampblack	lb.	.06 @	.08
"Micronex"	lb.	.0535 @	.0825
"Supreme"	lb.	.0535 @	.0825
Thermatomic—"P 33"	lb.	— @	—
"Thermax"	lb.	— @	—
United "Dixie" & "Kosmos"	lb.	.0535 @	.0825

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85 @	24.50
Ammonia carbonate, lump	lb.	.10½ @	.12
Asbestine	ton	14.00 @	15.00
Barium carbonate (98-100%)	ton	56.50 @	61.50
Barium Dust	lb.	.05 @	.06
Barytes southern off-color	ton	10.00 @	18.00
Western prime white	ton	23.00 @	30.00
Basofor	lb.	.04½ @	—
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	42.50 @	70.00
Calcene	ton	35.00 @	45.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	60.00 @	75.00
heavy	ton	45.00 @	55.00
Clay, Kaolin, domestic	ton	7.50 @	15.00
Aerfloted, Suprex	ton	7.50 @	10.00
Congaree	ton	9.00 @	—
Dark Blue Ridge	ton		
Dixie	ton		
Lexington	ton	10.00 @	22.00
McNamee	ton		
Par	ton		
Tensulite		15.00 @	—
Cotton Flock	lb.	.10½ @	.18
Glues, extra white	lb.	.28 @	.30
medium white	lb.	.14 @	.19
Kalite No. 1	ton	30.00 @	55.00
Kalite No. 3	ton	40.00 @	65.00
Magnesium carbonate	lb.	.06½ @	.06¾
Mica	ton	65.00 @	80.00
Rottenstone (powdered)	lb.	.02½ @	.05
Soapstone, powdered	ton	16.00 @	22.00
Starch, powdered	cwt.	3.56 @	3.76
Talc, domestic	ton	12.00 @	15.00
Pyrax A	ton		
Whiting, commercial	ton	17.00 @	18.00
English Cliffstone	ton	33.00 @	43.00
Sussex	ton		
Witco	ton	20.00 @	50.00
Wood Flour	ton	18.00 @	30.00
Zinc Carbonate	lb.	.09½ @	.11
Zinc Stearate	lb.	.25 @	—

MINERAL RUBBER

Genasco, solid (factory)	ton	25.00 @	27.00
Hard Hydrocarbon	ton		
Parmr, solid	ton	21.00 @	26.00
Pioneer, MR. solid	ton		
Pioneer-granulated	ton		

WETTING AGENTS

Arkesklene	lb.	— @	—

SPECIALTIES

Aromatics—Rodo	lb.		
Para-Dors No. 5145	lb.	2.00 @	—
Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.80
Tonox	lb.	.56 @	.60

SOFTENERS

Acids			
Nitric, 36 degrees	cwt.	5.00 @	5.25
Sulfuric, 66 degrees	cwt.	1.60 @	1.90
Tartaric, crystals	lb	.26 @	—
Acids, Fatty			
Laurex	lb.	.15 @	.16
Stearex	lb.	.08 @	.12
Stearic, double pressed	lb.	.08 @	.12
Alkalies			
Caustic Soda, 76%	cwt.	3.60 @	3.75
Soda Ash, 58% C.L.	cwt.	2.52 @	-
Oils			
Corn, refined, bbls.	lb.	.08½ @	.08¾
Cottonseed, crude	gal.	— @	.04
Cycline Oil	gal.	.15 @	.28
Degras (c.l. 100 bbls.)	lb.	.02¾ @	—
Less c.l. (10-25 bbls.)	lb.	.03 @	—
Lots less than 10 bbls.	lb.	.03¼ @	—
Fluxrite	lb.	.05½ @	.06½
Palm Lagos	lb.	.03½ @	.03¾
Niger	lb.	.03¼ @	.03½
Para-Flux	gal.	.17 @	—
Petrolatum, light	lb.	.02 @	.02½
Pigmentaroil, tank cars.	gal.	.14 @	—
in drums	gal.	.20 @	.21½
Pine, steam distilled	gal.	.64 @	.65
dest. dist., drums	gal.	.59 @	.62
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	.07½ @	—
Witco Softener (f.o.b. wks.)	lb.	.02 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Wobonite, c.l.	lb.	.05 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.05 @	.06
coal tar	gal.	.05½ @	.06
hardwood	ton	20.00 @	25.00
pine, 200 lb. gr. wt.	bbl.	6.00 @	—
Rosin, grade K, 280 lb.	bbl.	5.55 @	—
Pigmentar, tank cars.	gal.	.14 @	—
in drums	gal.	.20 @	.21½
R. S. L. Resin	lb.	— @	—
Tar Retort, drums	bbl.	12.50 @	—
Solvents			
Acetone, pure	lb.	.12½ @	.13½
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.30½ @	.35½
Benzene, 90%	gal.	— @	.19
Bondogen	lb.	— @	—
Carbon, bisulfide	lb.	.05½ @	.06
Carbon, tetrachloride	lb.	.05¾ @	.08½
Dichlorethylene	lb.	.29 @	—
Dipentene	gal.	.31 @	.41
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Ethylene dichloride	lb.	.05½ @	.06½
Gasoline, steel bbls.	gal.	.16 @	—
Naphtha, solvent	gal.	.26 @	.31
Plastogen	lb.		
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Turpentine, spirits	gal.	.46½ @	.50½
wood	gal.	.41 @	—
dest. dist., drums	gal.	.40 @	.44
Waxes			
Beeswax, white	lb.	.34 @	.37
Carnauba, yellow	lb.	.34½ @	.37
Ceresin, white	lb.	.10 @	.11
Montan, crude	lb.	.10 @	.11
Ozokerite, black	lb.	.24 @	.25
green	lb.	.26 @	.30
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.03 @	—
White crude scale 124/126	lb.	.03 @	—
Refined, 125/127	lb.	.04¾ @	—

ANTI-OXIDANTS

AgeRite, Gel	lb.		
Powder	lb.		
Resin	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Flectol-H and Flectol-White	lb.	.54 @	.62
Neozone	lb.		
Oxynone	lb.	.66 @	.90
Resistox	lb.	.52 @	.65
Retardex	lb.	.35 @	.40
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.60

MOLD LUBRICANTS

Cocoa Soapstock	lb.	.06 @	.08
Dipex	lb.	.06 @	.08
Rusco, f.o.b. Nitro	lb.	.12 @	.30
Sericite, f.o.b. N. Y.	ton	65.00 @	—
Soap Tree Bark, cut, sifted	lb.	.06 @	.08
Zip (Mold Wash)	lb.	— @	—

SUBSTITUTES (FACTICE)

Amberex	lb.	.13¾ @	—
Black	lb.	.08½ @	—
White	lb.	.08 @	.12
Brown	lb.	.07 @	.11½

VULCANIZING INGREDIENTS

Sulfur Chloride, yellow (drs.)	lb.	.03½ @	.04½
Sulfur flour,			
Refined, 100% pure (bags)	cwt.	3.45 @	—
Commercial (bags)	cwt.	1.95 @	2.80
Telloy	lb.		
Vandex	lb.		

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,735,488	39.76	398,483
1928	439,731	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,733	20.64	523,599
1930	482,082	139,134,330	12.89	30,205	9,316,205	13.77	451,877
1931	497,138	72,918,949	6.54	25,595	4,255,472	7.42	471,543
1932	409,584	31,936,459	3.47	20,929	2,015,612	4.30	388,655
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	427,280
1932:							
August	33,449	2,027,045	2.71	1,339	128,952	4.29	32,110
Sept.	28,956	1,774,403	2.73	2,388	241,960	4.54	26,568
Oct.	35,096	2,436,522	3.10	1,059	98,022	4.13	34,037
Nov.	28,908	2,263,469	3.48	1,745	158,618	4.06	27,163
Dec.	31,384	2,360,061	3.34	770	66,165	3.98	30,614
1933:							
Jan.	29,822	2,213,828	3.03	1,403	109,916	3.49	28,419
Feb.	22,603	1,554,086	3.12	1,244	102,129	3.73	21,359
Mar.	27,936	1,867,657	2.98	1,127	86,216	3.42	26,809
April	20,240	1,291,136	2.85	798	70,111	3.92	19,442
May	26,002	1,694,963	2.93	1,842	189,451	4.59	24,894
June	22,900	1,780,495	3.47	1,276	156,168	5.46	21,624
July	44,625	4,293,111	4.29	1,419	219,945	6.92	43,206
August	44,257	5,391,709	5.44	2,205	302,132	6.12	42,052
Sept.	44,912	6,110,956	6.07	2,369	335,798	8.89	42,543
Oct.	44,474	6,115,330	6.14	2,669	397,167	6.64	41,805
Nov.	40,582	5,850,714	6.44	2,188	333,631	6.81	38,394
Dec.	39,461	5,869,556	6.75	1,888	293,690	6.94	37,573
1934:							
Jan.	47,963	7,403,123	6.89	1,975	352,116	7.96	45,988
Feb.	34,335	5,262,711	6.84	2,133	476,232	9.97	32,202
Mar.	41,119	6,765,173	7.34	2,947	583,313	8.83	38,172
April	43,841	8,232,746	8.37	2,814	588,453	9.18	41,027
May	48,494	10,001,239	9.21	2,389	544,212	10.17	46,105
June*	47,289	10,747,464	10.14	2,012	501,499	11.33	45,277
July	41,443	9,670,617	10.41	2,366	660,199	13.99	39,077
August	31,531	7,873,690	11.15	1,393	400,433	12.83	30,138

* Revised.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule: Tons	Guayule: Dollars	Balata: Tons	Balata: Dollars	Jelutong: Tons	Jelutong: Dollars	Liquid Latex (1): Tons	Liquid Latex (1): Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,853	3,537,810
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,388	4,680,386
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,116	876,077
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	4,167	2,185,579
1929	1,231	545,175	728	566,964	8,203	2,458,136	3,728	1,787,997
1930	1,096	347,388	501	422,684	5,907	1,403,244	4,449	1,506,804
1931	—	—	1,208	411,692	5,777	1,019,010	4,650	884,355
1932	—	—	708	147,403	4,607	616,596	5,085	601,999
1933	—	—	1,658	2,261,869	5,989	944,895	11,085	1,833,671
1933:								
July	—	—	238	76,141	638	79,049	618	85,636
Aug.	—	—	272	527,147	390	55,509	1,156	196,138
Sept.	—	—	65	30,738	761	149,296	1,343	267,516
Oct.	—	—	119	47,663	542	99,249	1,561	310,531
Nov.	—	—	31	11,252	626	125,160	1,239	282,065
Dec.	—	—	42	20,008	708	143,868	1,290	270,533
1934:								
Jan.	—	—	98	43,932	766	169,966	1,126	239,054
Feb.	—	—	68	36,346	453	102,471	885	193,732
Mar.	51	9,464	145	51,080	25	43,532	1,134	257,545
April	100	18,928	128	50,965	533	98,658	1,334	321,390
May	100	18,928	143	65,471	538	95,710	1,407	368,642
June	—	—	84	49,881	388	71,672	1,458	421,317
July	—	—	160	63,963	482	87,412	1,231	385,733
August	100	18,607	100	36,732	516	85,651	1,169	369,335

(1) Weight given in pounds of dry rubber contained in latex.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1927	1928	1929	1930	1931	1932	1933	1934
Jan.	31,518	34,403	43,002	36,194	28,557	29,648	21,661	40,413
Feb.	30,137	33,702	41,594	33,302	28,797	31,821	21,638	40,609
Mar.	36,141	35,688	44,730	35,540	32,788	29,505	18,047	47,097
Apr.	35,871	32,772	47,521	39,686	33,321	27,515	25,928	44,947
May	34,592	37,333	49,233	39,386	37,817	30,957	44,074	43,012
June	33,801	37,676	43,227	34,195	37,916	41,475	50,743*	40,241
July	29,219	37,407	41,526	29,508	31,397	29,976	49,614*	32,647
Aug.	33,460	42,987	38,274	30,850	27,586	23,721	44,428*	33,310
Sept.	27,214	39,882	34,707	25,515	23,638	23,847	35,686	.....
Oct.	26,790	40,857	34,800	27,516	22,277	22,286	31,906	.....
Nov.	26,792	37,461	27,659	23,691	22,943	23,231	29,162	.....
Dec.	25,492	31,232	25,531	21,682	21,409	18,015	29,087	.....
Tot.	371,027	441,340	469,804	375,980	348,986	332,000	402,485*	.....

* Revised.

Figures on Quarterly Basis

Quarter	1926	1927	1928	1929	1930	1931	1932	1933
Jan./Mar.	94,301	99,216	103,558	128,565	101,610	89,652	85,309	64,326
Apr./June	87,109	103,242	103,500	139,292	112,229	107,755	92,643	125,126
July/Sept.	93,793	89,210	117,573	113,746	85,261	83,632	72,523	132,406
Oct./Dec.	83,212	80,860	117,597	84,872	72,020	65,645	64,145	94,198
Totals	358,415	372,528	442,227	466,475	371,120	346,684	314,620	416,056

Note—The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*	Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1924	80,079	76,072	22.4	.....	1929	218,954	226,588	48.4	27,464
1925	132,930	137,105	35.6	13,203	1930	157,967	153,497	40.8	22,000
1926	180,582	164,500	45.9	23,213	1931	133,351	124,126	33.9	19,257
1927	189,144	178,471	47.6	24,980	1932	75,608	77,504	23.4	16,354
1928	208,516	223,000	50.4	24,785	1933	99,560	81,602	19.9	20,746
1933:									
Jan.	5,301	4,811	21.0	16,262	July	12,049	10,317	20.8	a 14,108
Feb.	4,578	4,363	20.2	16,570	Aug.	11,708	9,446	21.0	15,037
Mar.	3,847	3,454	19.1	15,496	Sept.	10,435	7,862	22.0	15,869
Apr.	4,617	4,407	13.1	14,370	Oct.	9,466	7,212	22.6	17,748
May	8,366	7,770	17.4	13,734	Nov.	9,063	6,335	21.7	19,170
June	10,591	9,674	19.1	13,231	Dec.	9,539	5,951	20.5	20,746
1934:									
Jan.	9,828	7,000	17.3	24,263	July	9,446	8,175	25.0	24,926
Feb.	9,504	7,646	18.8	23,356	Aug.	8,160	8,493	25.5	24,607
Mar.	11,479	9,683	20.6	25,113	Sept.	....	....	...	....
Apr.	10,185	9,387	20.9	22,033	Oct.	....	....	...	....
May	10,848	9,500	22.1	22,887	Nov.	....	....	...	....
June	10,820	9,459	23.5	23,664	Dec.	....	....	...	....

* Stocks on hand at the end of month or year.
a Revised.
(Rubber Manufacturers' Association figures raised to 100%)

U. S. Consumption of Gasoline

(In Thousands of Barrels of 42 Gallons)

	1932	1933*	1934		1932	1933*	1934
January	26,038	26,397	29,416	August	35,706	37,400	38,933
February	25,378	23,320	25,048	September	33,828	34,580	.....
March	29,597	28,123	30,528	October	32,680	33,022	.....
April	31,234	29,791	32,735	November	29,895	30,312	.....
May	32,016	33,709	38,141	December	27,110	28,572	.....
June	39,489	37,699	36,296				
July	30,929	34,087	37,393	Total	373,900	377,003*	.....

* Revised on basis of final 1933 figures issued September 26, 1934 by Bureau of Mines.

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1932																																
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Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1929

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50	1926	48.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55

Average Monthly Price per Pound Since 1928

Month	1928 Cents	1929 Cents	1930 Cents	1931 Cents	1932 Cents	1933 Cents	1934 Cents
Jan.	40.25	20.14	15.24	8.34	4.38	3.08	9.32
Feb.	32.75	23.97	15.85	7.70	4.03	2.95	10.45
Mar.	26.82	24.55	15.34	7.71	3.35	3.01	11.01
Apr.	18.97	21.18	14.93	6.43	3.02	3.56	12.10
May	18.99	21.46	14.24	6.49	3.09	4.95	13.26
June	19.59	20.64	12.45	6.35	2.66	6.15	13.51
July	19.40	21.30	11.24	6.37	2.89	8.01	14.60
Aug.	19.46	20.59	9.96	5.38	3.63	7.31	15.47
Sept.	18.47	20.37	8.28	5.08	3.84	7.30	15.36
Oct.	18.83	19.67	8.20	4.87	3.65	7.64	....
Nov.	18.26	16.62	9.01	4.65	3.44	8.66	....
Dec.	17.97	16.12	9.05	4.64	3.24	8.87	....
Average for Year	22.48	20.55	11.98	6.17	3.49	5.96	....

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	July	Aug.	Sept.	Oct.	Day	July	Aug.	Sept.	Oct.
1		7 1/16		7 1/16	17	7	7 1/16	7 3/16	
2	6 3/4	7 1/8		7 1/16	18	7 1/16		7 3/16	
3	6 13/16	7 1/8	7 1/16	6 13/16	19	7 1/8		7 1/8	
4	7 1/16		7 1/16	7	20	7 1/8	7 1/16	7 1/4	
5	7 1/8		7 1/16	6 3/4	21	7 1/8	7 1/2	7 3/16	
6	7 1/16		7 1/8	6 13/16	22		7 1/16	7 1/8	
7	7	7 1/16	7 1/16		23	7 1/8	7 1/8		
8		7 1/8			24	7 1/16	7 1/2	7 1/16	
9	7	7 1/8			25	7		7 1/8	
10	7 1/16	7 1/16	7 1/16		26	6 13/16		7 1/16	
11	7 1/8		7 1/16		27	7	7 1/8	7 1/16	
12	7 1/8		7 1/2		28	7	7 1/2	7 1/8	
13	7	7 1/16	7 3/16		29		7 1/2	7 1/4	
14	7 1/16	7 1/8	7 1/8		30	7 1/16	7 5/8		
15		7 1/8			31	7 1/8	7 9/16		
16	7	7 1/16							

Average Monthly Price Per Pound

Month	1931 Pence	1932 Pence	1933 Pence	1934 Pence	Month	1931 Pence	1932 Pence	1933 Pence	1934 Pence
Jan.	4.160	3.052	2.264	4.429	Aug. ...	3.385	2.654	3.811	7.401
Feb. ...	3.823	2.760	2.093	4.920	Sept. ..	2.524	2.485	3.728	7.409
Mar. ...	3.822	2.047	2.099	5.136	Oct. ...	2.898	2.425	3.957	
Apr. ...	3.082	1.876	2.323	5.712	Nov. ..	2.890	2.518	4.096	
May ...	3.035	1.825	2.966	6.207	Dec. ..	3.115	2.444	4.200	
June ...	3.082	1.750	3.392	6.245	Average for				
July ...	3.048	1.875	3.860	7.053	Year ...	3.155	2.434	3.233	

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	Aug.	Sept.	Oct.	Date	Aug.	Sept.	Oct.	Date	Aug.	Sept.	Oct.
1	13.20	——	12.50	11	13.55	13.30		21	13.55	13.00	
2	13.20	——	12.50	12	——	13.15		22	13.30	12.85	
3	13.10	——	12.40	13	13.60	13.10		23	13.40	——	
4	13.15	13.15	12.40	14	13.45	13.05		24	13.50	12.85	
5	——	13.35	12.45	15	13.60	12.95		25	13.35	12.80	
6	13.20	13.35	12.40	16	13.50	——		26	——	12.70	
7	13.30	13.35		17	13.30	12.95		27	13.25	12.65	
8	13.75	13.40		18	13.15	13.05		28	13.35	12.55	
9	13.95	——		19	——	12.80		29	13.40	12.70	
10	13.75	13.20		20	13.40	12.85		30	13.20	——	
								31	13.35	——	

Average Monthly Price Per Pound

	1931 Cents	1932 Cents	1933 Cents	1934 Cents		1931 Cents	1932 Cents	1933 Cents	1934 Cents
Jan.	10.27	6.65	6.23	11.25	Aug. ...	7.21	7.43	9.55	13.40
Feb. ...	10.96	6.85	6.05	12.28	Sept. ...	6.52	6.30	9.64	13.00
Mar. ...	10.90	6.86	6.39	12.30	Oct. ...	6.32	6.30	9.58	
Apr. ...	10.19	6.16	7.02	11.80	Nov. ...	6.44	6.22	10.04	
May ..	9.38	5.72	8.64	11.44	Dec. ...	6.25	6.00	10.17	
June ...	9.05	5.02	9.47	12.20	Average for				
July ...	9.28	5.87	10.76	12.84	Year ...	8.56	6.41	8.63	

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND			AFLOAT			ON HAND AND AFLOAT		
	1932	1933	1934	1932	1933	1934	1932	1933	1934
Jan.	322,860	396,376	368,660	42,234	32,539	45,768	365,094	428,915	414,428
Feb.	318,936	381,794	357,094	51,728	32,898	53,063	370,604	414,692	410,157
Mar.	329,586	390,135	353,242	44,190	29,531	54,722	373,776	419,666	405,786
Apr.	336,957	382,167	351,981	40,387	30,745	56,251	377,344	412,912	408,232
May	336,719	364,623	351,329	50,453	43,342	57,921	387,172	407,965	409,250
June	334,657	333,954	358,149	43,079	63,608	46,698	377,736	397,562	404,847
July	333,729	326,609	364,883	37,894	57,435	45,869	371,623	384,044	410,752
Aug.	342,888	325,148	362,647	42,846	53,084	40,278	385,734	378,232	402,925
Sept.	346,154	334,637		46,188	57,255		342,342	391,892	
Oct.	358,282	343,579		40,176	58,568		398,458	402,147	
Nov.	360,386	353,852		40,879	57,140		401,265	410,992	
Dec.	379,000	364,541		38,360	55,606		417,360	419,147	

(Rubber Manufacturers' Association figures raised to 100%)

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1932	1933	1934	At end of	1932	1933	1934
Jan.	67,166	36,481	38,570	July	48,842	41,178	50,490
Feb.	65,942	37,182	38,752	Aug.	47,079	39,480	48,953
Mar.	64,280	40,689	40,501	Sept.	44,942	39,237	
Apr.	61,848	40,911	42,413	Oct.	42,327	37,101	
May	56,089	41,998	42,190	Nov.	40,606	36,139	
June	51,009	43,032	45,674	Dec.	37,407	35,615	

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1934					
March	39,680	39,670	40,174	40,178	40,480
April	40,994	41,458	41,589	42,539	
May	41,815	42,908	41,900	42,118	
June	42,503	43,308	43,709	44,157	45,711
July	47,607	48,908	49,654	49,834	
Aug.	50,860	51,555	51,640	51,362	
Sept.	48,255	50,028	52,320	53,924	56,030

Stocks in Liverpool

1934					
March	52,832	53,488	53,929	54,109	54,004
April	54,464	53,832	54,119	53,917	
May	53,915	54,268	54,123	54,276	
June	54,103	54,294	54,327	54,228	54,161
July	54,966	55,141	55,749	55,556	
Aug.	55,467	55,681	55,757	56,343	
Sept.	56,383	58,006	58,182	59,028	57,477

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1931	1932	1933	1934	End of	1931	1932	1933	1934
Jan.	48,802	48,850	22,525	40,405	July	51,203	17,017	36,972	65,099
Feb.	49,283	46,954	21,530	41,884	Aug.	48,971	20,649	38,601	
Mar.	49,590	46,591	24,594	47,933	Sept.	47,025	20,415	36,948	
Apr.	45,868	39,663	25,460	48,431	Oct.	52,132	23,158	37,282	
May	44,278	38,690	29,822	76,393	Nov.	46,947	25,419	39,018	
June	47,517	19,770	34,676	73,218	Dec.	45,795	25,341	38,269	

STOCKS IN OTHER CENTRES

End of:	Malaya Mainland	Afloat for Europe	Holland	Colombo	Para and Manaos
1933					
June	35,919	22,930	1,147	2,913	4,321
July	35,020	22,900	1,007	3,208	3,830
Aug.	36,756	22,000	1,033	3,411	3,588
Sept.	36,083	25,900	1,107	4,286	3,288
Oct.	37,302	28,320	1,411	4,889	3,237
Nov.	36,965	38,530	1,285	5,575	3,383
Dec.	38,441	36,700	1,052	5,792	2,981
Jan., 1934	36,788	39,250	1,115	7,271	3,305
Feb.	39,630	36,563	906	5,366	3,420
Mar.	37,275	33,365	904	4,083	3,519
Apr.	33,765	32,640	905	4,070	3,624
May	7,213	39,370	897	3,066	3,556
June	20,243	36,870	902	3,533	3,273
July	27,235	35,000	1,263	4,683	....
August	30,507	35,000	....	....	....

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1924	21,863,311	1928	24,247,282	1932	6,261,336
1925	26,001,664	1929	24,141,502	1933	8,713,962
1926	24,199,524	1930	17,364,096	1934	.....
1927	19,700,003	1931	11,253,800	1935	.....

1934:		1934:		1934:	
January	789,274	May	1,140,132	September	526,472
February	1,262,311	June	1,015,730	October	.....
March	1,651,548	July	1,155,024	November	.....
April	1,635,722	August	752,074	December	.....

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1926	1927	1928	1929	1930	1931	1932	1933
Production	61,237	64,439	77,944	68,726	50,965	48,739	40,085	45,304
Shipments	59,002	64,059	74,296	69,395	53,638	48,151	40,260	44,094
Inventory[2]	10,456	10,264	13,624	11,838	9,003	7,775	7,644	8,888

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1932	1933	1934	1932	1933	1934	1932	1933	1934
Jan.	3,462	2,258	3,922	3,253	2,597	3,222	7,912	7,237	9,684
Feb.	3,871	2,339	4,335	2,553	2,292	3,285	9,172	7,377	10,725
Mar.	3,671	2,038	5,180	2,954	2,092	4,223	9,878	7,290	11,651
Apr.	3,517	3,123	4,470	3,698	3,654	4,438	9,846	6,778	11,981
May	3,820	5,189	4,456	4,258	5,180	5,332	9,379	6,760	11,127
June	5,643	6,100	4,342	10,065	6,305	5,228	4,999	6,615	10,219
July	3,617	5,714	3,353	2,404	5,497	4,157	6,203	6,844	9,437
Aug.	3,089	4,994		2,655	4,707		6,659	7,070	
Sept.	2,539	3,999		3,082	3,503		6,096	7,595	
Oct.	2,569	3,429		1,799	2,537		6,876	8,462	
Nov.	2,304	3,039		1,711	2,197		7,454	9,247	
Dec.	1,983	3,082		1,819	3,531		7,644	8,888	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1926	1927	1928	1929	1930	1931	1932	1933
Production	76,618	70,823	80,180	68,829	52,420	48,333	36,891	42,546
Shipments	71,591	72,896	77,127	70,592	54,938	50,021	37,911	41,391
Inventory[2]	16,200	13,692	16,117	12,807	9,999	7,922	6,749	7,815

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1932	1933	1934	1932	1933	1934	1932	1933	1934
Jan.	3,308	2,093	3,530	3,529	2,535	3,199	7,719	6,197	8,403
Feb.	3,281	2,224	4,077	2,728	2,102	3,323	8,760	6,357	8,445
Mar.	3,502	1,883	5,194	2,686	1,902	4,118	9,448	6,369	10,244
Apr.	3,225	2,853	4,735	3,385	3,051	4,342	9,441	6,189	10,585
May	3,820	5,189	4,359	4,258	5,180	4,902	9,379	6,760	10,043
June	5,279	5,448	4,097	9,019	5,778	5,309	5,174	6,097	8,795
July	2,937	5,603	3,531	2,160	5,211	4,323	5,975	6,440	8,053
Aug.	2,748	4,916		2,503	4,687		6,127	6,628	
Sept.	2,601	3,827		3,098	3,472		5,753	7,008	
Oct.	2,187	3,506		1,658	2,676		6,214	7,831	
Nov.	2,005	2,863		1,578	2,103		6,662	8,625	
Dec.	1,779	2,631		1,724	3,410		6,749	7,815	

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% complete up until 1929 and 80% complete for 1929-1933. Beginning 1934, the Association reported its figures to be 97% complete.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States			Canada			
	Total	Passenger Cars	Trucks	Total	Passenger Cars	Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1933*							
July	233,141	195,023	38,118	6,540	5,322	1,218	239,681
Aug.	236,556	195,144	41,412	6,079	4,919	1,160	242,635
Sept.	196,143	160,900	35,243	5,808	4,358	1,450	201,951
Oct.	138,542	108,073	30,469	3,682	2,723	959	142,224
Nov.	63,987	44,429	19,558	2,291	1,503	786	66,278
Dec.	84,152	53,900	30,252	3,262	2,171	1,091	87,414
1934							
Jan*	156,907	113,652	43,255	6,904	4,946	1,958	153,811
Feb.*	231,707	187,666	44,041	8,571	7,101	1,470	240,278
Mar.*	331,263	274,738	56,625	14,180	12,272	1,908	345,443
Apr.*	354,745	289,031	65,714	18,363	15,451	2,912	373,108
May*	331,652	273,765	57,887	20,161	16,504	3,657	351,813
June*	308,065	261,852	46,213	13,905	10,810	3,095	321,970
July*	266,576	223,868	42,708	11,114	8,407	2,707	277,690
August	234,809	183,500	51,309	9,904	7,325	2,579	244,713

* Revised.

Exports of Crude Rubber from Principal Producing Countries

(*Long Tons*)

	BRITISH MALAYA [1]							DUTCH EAST INDIES [6]						
	Gross Exports	Gross Exports Minus Imports	Imports	Ceylon [2]	India & Burma [3]	Sarawak [4]	British North Borneo [5]	Siam [4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [3]	Amazon Valley	All Other [6]	World Total [7]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,657	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,562	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1932:															
Nov.	40,098	10,072	30,026	4,146	185	683	350	371	4,368	6,250	9,080	805	1,164	156	57,588
Dec.	40,118	10,089	30,029	5,801	367	644	350	406	4,683	7,066	8,594	1,211	824	150*	59,493
1933:															
Jan.	46,599	7,857	38,742	4,602	318	590	458	305	4,766	5,630	6,840	1,957	554	125*	58,887
Feb.	37,564	6,167	31,397	5,064	304	541	458	368	4,895	5,119	6,081	895	620	125*	55,867
Mar.	42,059	7,964	34,095	4,905	389	571	458	304	5,092	6,466	6,999	1,102	995	125*	61,501
Apr.	36,752	7,758	28,994	4,582	272	624	583	235	5,226	5,969	8,147	1,122	556	125*	56,435
May	42,902	13,664	29,238	4,643	475	1,091	583	359	6,782	7,298	13,195	1,371	918	125*	66,078
June	41,411	16,538	24,873	5,198	377	1,149	582	632	7,352	6,654	14,779	1,369	704	125*	63,794
July	50,531	18,772	31,759	4,201	270	1,358	728	797	7,367	8,580	16,534	1,310	913	125*	73,942
Aug.	52,266	17,869	34,397	5,839	246	955	728	926	6,460	7,985	15,161	808	1,116	125*	74,746
Sept.	49,607	15,146	34,461	5,111	125	1,027	728	611	5,868	9,164	15,005	1,702	656	125*	74,452
Oct.	61,002	17,390	43,612	5,674	271	959	750	979	6,329	8,692	15,170	1,513	965	125*	84,879
Nov.	54,599	20,142	34,457	6,097	516	1,020	750	1,191	6,684	9,951	14,474	1,599	956	125*	77,820
Dec.	57,579	18,110	39,469	7,062	964	989	978	1,046	7,030	10,183	17,274	2,173	930	125*	88,223
1934:															
Jan.	55,055	21,184	33,871	7,551	1,531	1,197	805	1,290	6,513	8,974	17,718	2,158	576	125*	82,309
Feb.	57,867	19,688	38,179	8,354	775	1,005	805	1,264	6,706	10,277	17,466	1,100	831	125*	86,887
Mar.	58,515	26,470	32,045	6,954	1,412	1,360	806	1,363	8,655	12,043	25,064	1,316	846	125*	91,989
Apr.	56,748	27,963	28,785	5,783	762	1,447	894	1,311	7,282	11,324	24,054	1,519	440	125*	83,726
May	69,403	34,093	35,310	7,528	1,106	1,892	1,397	997	12,104	16,720	34,710	1,408	726	125*	114,023
June	53,282	20,981	32,301	3,305	1,425	1,886	644	1,497	4,860	6,078	15,216	1,504	765	125*	69,606
July	53,335	22,829	30,506	4,093	710	1,662	1,048	2,399	5,762	7,408	14,182	1,703	.....	125*	.....
Aug.	52,641	17,865	34,776	5,369	552	1,714	1,048	1,908	5,340	8,902	10,902	1,610	.....	125*	.....
Sept.	61,051	17,889	43,162	6,632											

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional; final figure will be shown when available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(*Long Tons*)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,495	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	.....
1933:															
May	24,894	11,085	4,144	4,622	1,704	5,289	1,278	1,691	425	710	—525	536	433	432	56,718
June	22,228	8,739	4,056	3,639	1,441	3,330	1,997	2,000	613	469	—519	772	541	400	49,706
July	43,824	3,961	3,774	4,103	1,192	1,460	1,146	2,952	2,347	299	16	486	435	287	66,282
Aug.	43,208	4,330	5,251	4,193	1,795	4,424	1,249	3,312	1,500	325	209	616	606	2,759	73,779
Sept.	43,886	4,341	4,111	5,841	2,620	5,369	2,055	2,168	794	864	189	604	790	577	74,211
Oct.	43,366	3,373	4,921	4,772	2,580	6,150	1,836	2,084	604	1,118	310	777	441	686	73,081
Nov.	39,633	3,955	5,419	4,086	2,184	6,296	942	4,483	301	1,129	222	878	493	882	70,903
Dec.	38,864	6,524	5,415	4,933	1,773	6,865	1,029	2,400	190	1,360	213	703	776	1,772	72,817
1934:															
Jan.	47,114	9,503	6,472	6,057	1,721	5,628	2,517	2,749	566	2,173	381	1,185	484	1,355	88,276
Feb.	33,087	10,785	5,301	5,490	1,854	4,570	2,388	3,399	950	1,538	287	464	656	516	73,357
Mar.	39,306	14,008	4,980	6,453	3,411	5,655	1,394	4,018	671	965	284	836	394	976	86,242
Apr.	42,262	9,999	3,210	6,701	2,419	5,679	1,966	1,326	415	504	262	1,217	752	465	77,177
May	47,412	9,786	3,634	6,499	2,218	6,905	2,218	4,360	769	214	322	940	142	1,768	87,192
June	46,785	16,564	3,803	6,171	2,208	6,745	1,887	3,145	1,512	837	331	843	1,146	1,624	93,601
July	40,308	12,266	4,051	5,494	2,430	5,739	708	1,640	732	810	540	1,602	747	1,094	78,161
Aug.	31,405	13,728		3,078	1,948						239				

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown immediately it becomes available.

A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

The Market Place

Chemicals and Compounding Materials — Machinery and Equipment—Crude, Reclaimed and Scrap Rubber—Fabrics—Rubber Products — Consulting Engineers.

Chemicals and Compounding Materials —

ACCELERATORS—
Ureka C—Ureka Blend B—Ureka.—A-1, A-7, A-11, A-16, A-19, A-32, Z-88, A-510, DPG
ANTIOXIDANTS — Flectol A, Oxynone
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Godfrey L. Cabot, Inc.
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IN this section are listed the products of the leading producers of materials and equipment used by rubber manufacturers.

When buyers refer to these pages for their needs, your name and address and a description of your products should be available here. The cost of a one-inch listing is only $5.00 per issue—the lowest cost of advertising space available in the rubber field.

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